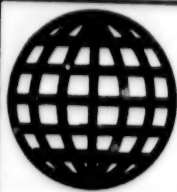


JPRS-TND-90-019  
25 OCTOBER 1990



**FOREIGN  
BROADCAST  
INFORMATION  
SERVICE**

---

# ***JPRS Report***

# **Nuclear Developments**

---

# Nuclear Developments

JPRS-TND-90-019

## CONTENTS

25 OCTOBER 1990

### SUBSAHARAN AFRICA

#### SOUTH AFRICA

ESKOM Chief on Use of Nuclear, Coal Power [SAPA] .....	1
Pik Botha Comments on Nuclear Explosion Memo [SAPA] .....	1
Defense Minister on CIA Nuclear Weapons Memo [SAPA] .....	1
Nation Seeks Nuclear Free Southern Africa .....	2
U.S., British, Soviets Consulted [BUSINESS DAY 19 Sep] .....	2
Proposal Lauded [Johannesburg International] .....	2

### CHINA

Journal Discusses Spread of Missile Technology [GUOJI WENTI YANJIU 13 Jul] .....	4
First Pulse Reactor Successfully Developed [ZHONGGUO XINWEN SHE] .....	11

### EAST ASIA

#### INDONESIA

Nuclear Experts To Study at FRG Institute [ANTARA] .....	12
--	----

#### JAPAN

Nakayama Seeks Inspection of North Korean Facilities [KYODO] .....	12
Experts To Be Sent to PRC Nuclear Station [KYODO] .....	12

#### NORTH KOREA

U.S. Request on Nuclear Safeguards Assailed [Pyongyang Radio] .....	13
Kim Denies Nuclear Weapons Program [Tokyo KYODO] .....	13

### EAST EUROPE

#### INTRABLOC

Agreement With CSFR on Nuclear Cooperation [Budapest MTI] .....	15
---	----

#### CZECHOSLOVAKIA

FRG, U.S. Firms Offer Nuclear Power Equipment [HOSPODARSKE NOVINY 19 Sep] .....	15
General Public Should Decide on Nuclear Power [MLADA FRONTA DNES 20 Sep] .....	15

#### HUNGARY

Nuclear Safety Agreement Signed With FRG [MTI] .....	16
--	----

#### POLAND

Industry Minister on Polish Nuclear Plant Freeze [ZYCIE WARSZAWY 19 Sep] .....	16
--	----

#### ROMANIA

IAEA Experts' Discuss Cernavoda Plant [ROMPRES] .....	17
---	----

Canadian Atomic Energy President Pays Visit .....	17
Roman Meets Energy Official [ROMPRES] .....	17
Iliescu Meets Energy Official [ROMPRES] .....	17
IAEA To Inspect Cernavoda Nuclear Power Plant [ROMPRES] .....	17

## LATIN AMERICA

### ARGENTINA

CNEA Denies Radioactive Contamination Claim [BUENOS AIRES HERALD 5 Oct] .....	19
Expert Says Bomb Could Be Built in 2-3 Years [NOTICIAS ARGENTINAS] .....	19
Embalse Nuclear Power Plant Resumes Operations [LA PRENSA 14 Oct] .....	19

### BRAZIL

Military Projects Priority in Nuclear Program [FOLHA DE SAO PAULO 23 Sep] .....	19
Former Navy Chief on Nuclear Program [FOLHA DE SAO PAULO 24 Sep] .....	20
Collor Explains Deactivation of Bomb Program [Rio de Janeiro TV] .....	21
Collor To Enhance Powers of Strategy Body [FOLHA DE SAO PAULO 30 Sep] .....	21
Higher Nuclear Industry Investment Called For [O GLOBO 30 Sep] .....	22
Report Recommends Investment in Nuclear Sector [O GLOBO 30 Sep] .....	22
CNEN To Administer Nuclear Policy, Programs [O ESTADO DE SAO PAULO 28 Sep] .....	23
Report on Environmental Effects of Nuclear Research [O GLOBO 30 Sep] .....	24
Group Wants Nuclear Sector Under Civil Control [O GLOBO 30 Sep] .....	24
Agreement To Launch USSR Satellites Discussed [O GLOBO 3 Oct] .....	24
Group Recommends Completion of Nuclear Projects [O GLOBO 30 Sep] .....	25
Officials View Launch Site-for-Technology Trade [O GLOBO 2 Oct] .....	25
Nuclear Development Recommendations Made [O GLOBO 30 Sep] .....	26
Report Recommends Uranium Enrichment Methods [O GLOBO 30 Sep] .....	27
Paper Evaluates Key Officials in Nuclear Program [O GLOBO 30 Sep] .....	27
Minister on Nuclear Program, Alleged Test Site [O GLOBO 3 Oct] .....	28
Details of Electric Motor for Nuclear Submarine [O ESTADO DE SAO PAULO 3 Oct] .....	29
Reportage on Closing of Cachimbo Borehole .....	29
Collor's Motives Examined [O ESTADO DE SAO PAULO 20 Sep] .....	29
Legal Action Against Ministers [O ESTADO DE SAO PAULO 20 Sep] .....	30
Brazil, Argentina Reaffirm Nonproliferation Goal [GAZETA MERCANTIL 13 Sep] .....	31
Goldemberg Comments on Cachimbo Borehole Closing [GAZETA MERCANTIL 13 Sep] .....	32
New Medical Research Reactor Under Development [O GLOBO 14 Oct] .....	33

### CHILE

Arms Factory Reportedly Working on FAE Bombs .....	33
Company Statement [Buenos Aires DYN] .....	33
August Test Reported [Santiago Radio] .....	34
Link With Libya, Iraq Denied [Santiago Radio] .....	34

## NEAR EAST & SOUTH ASIA

### INDIA

Reporter Tells Usage of Dhruva, Cirus Reactors [THE TIMES OF INDIA 15 Aug] .....	35
AEC Chief Iyengar on Setting Up of Soviet Reactors [THE HINDU 5 Sep] .....	35

### IRAN

Atomic Energy Council Discusses Nuclear Reactors [IRNA] .....	36
Nuclear Energy Official Reports IAEA Ruling [Tehran Radio] .....	36
Official on FRG, USSR Nuclear Plant Links [IRNA] .....	37
Official Reviews Need for Nuclear Energy [IRNA] .....	37
Nation Elected to IAEA Board of Governors [IRNA] .....	37

## IRAQ

- Photographs Said To Point to Uranium Mining [London PRESS ASSOCIATION] ..... 37

## PAKISTAN

- Foreign Office Denies Report on Nuclear Furnaces [Islamabad Radio] ..... 38  
Minister Discusses Nuclear Nonproliferation Stance [THE PAKISTAN TIMES 13 Oct] ..... 38

## SOVIET UNION

- Concern Expressed Over Arms Race in Third World [KRASNAYA ZVEZDA 10 Oct] ..... 40  
Case Drags On Against Nuclear Power Station Equipment Supplier [TRUD 16 Sep] ..... 40  
Growing Nuclear Proliferation Threat Seen [RABOCHAYA TRIBUNA 20 Sep] ..... 42

## WEST EUROPE

### GERMANY

- Aid to Iraq on Missile Projects Reported [DER SPIEGEL 15 Oct] ..... 44

### FINLAND

- Loviisa Nuclear Waste Bound for USSR [Helsinki Radio] ..... 46

### IRELAND

- Government Urged To Take Action Over Sellafield [IRISH INDEPENDENT 31 Jul] ..... 46

## UNITED KINGDOM

- Dounreay Reprocessing of European Fuel Discussed [THE DAILY TELEGRAPH 14 Aug] ..... 46  
Commons Energy Panel Scores Nuclear Power Program [THE DAILY TELEGRAPH 14 Aug] ..... 46  
Treatment Plant for High-Level Nuclear Waste Opens [THE DAILY TELEGRAPH 15 Aug] ..... 47



## SOUTH AFRICA

### ESKOM Chief on Use of Nuclear, Coal Power

MB0410075590 Johannesburg SAPA in English  
0739 GMT 4 Oct 90

[Text] Grahamstown Oct 4 SAPA—South Africa would have to make greater use of nuclear power as the country's coal supplies would run out by the year 2030, ESKOM's [Electricity Supply Commission] chief of nuclear safety, Mr. John Walmsley, said in Grahamstown on Wednesday [3 Oct] night.

Taking part in a debate against Earthlife's Mr. Michael Kantey at Rhodes University on the option of nuclear power, he conceded coal-fired power stations were far more environmentally destructive than nuclear ones. Although South Africa's coal reserves were relatively large they were nevertheless finite and other countries were already facing up to the challenge of dwindling reserves. Hydroelectric power was accepted as the most desirable power option followed by nuclear energy then gas, oil and finally coal.

He predicted South Africa would order the simpler and cheaper generation of nuclear power reactors which would be available in 1995 and construction would begin in 1998. After that a nuclear power plant would have to be constructed every two years until 2020.

The current cost of a nuclear plant the size of Koeberg near Cape Town would be at least R [rand] 10 billion—which was more expensive than coal fired stations but about five times cheaper than solar power cells.

Mr. Kantey raised the issue of accidents while accepting the general running of a nuclear plant was "not problematic." He said more than 1.6 million people were contaminated after the Chernobyl accident in the Soviet Union. There was still no solution to the problem of nuclear waste which was toxic for up to 10,000 years, he added.

### Pik Botha Comments on Nuclear Explosion Memo

MB2809053190 Johannesburg SAPA in English  
2318 GMT 27 Sep 90

[Text] Pretoria Sept 27 SAPA—Allegations that South Africa had exploded a nuclear device over the southern Atlantic on September 22, 1979, were thoroughly investigated at the time and eventually discarded as unfounded and unsubstantiated, Foreign Affairs Minister Pik Botha said in a statement on Thursday [27 Sep] night.

Mr. Botha was reacting to allegations made on Wednesday by an American environmental group, the National Resources Defence Council (NRDC).

The NRDC released pages of the Central Intelligence Agency memo entitled "the 22 September 1979 event,"

which discusses a nuclear test over unfrequented international waters in the Southern Hemisphere on September 22, 1979, and appears to conclude South Africa was the most likely source.

Mr. Botha said he found it strange that the NRDC should choose this moment, after President de Klerk's successful visit to the United States, to try and resuscitate allegations based on an event supposed to have taken place as far back as September 1979.

A White House panel of scientific experts led by a Dr. Frank Press was appointed to investigate the event at the time. The panel concluded that a signal from a satellite—which had given rise to the allegation—was probably not caused by a nuclear explosion, Mr. Botha said.

Though the possibility that the signal was of nuclear origin could not be ruled out, the panel considered it more likely that it was a "zoo-event", a consequence of the impact of a small meteoroid on the satellite. Zoo events were described in their report as signals of unknown origin, which had several hundred times triggered the instruments on the satellite in question.

"Thus the alleged flash in the southern skies turned out to be little more than a flash in the pan," Mr Botha said. He referred to his statement on September 17, this year, which specified that the government was prepared to accede to the non-proliferation treaty in the context of an equal commitment by other states in the southern Africa region. In the meantime the government would continue to respect its non-proliferation responsibilities and commitments, he added.

The government intended to negotiate with the International Atomic Energy Agency in the near future, in an attempt to establish comprehensive safeguards to SA [South African] nuclear facilities, he said.

### Defense Minister on CIA Nuclear Weapons Memo

MB2709124590 Johannesburg SAPA in English  
1201 GMT 27 Sep 90

[Text] Johannesburg Sept 27 SAPA—An American Central Intelligence Agency memorandum which allegedly confirms the existence of South Africa's nuclear weapons programme was on Thursday [27 Sep] dismissed as "archaic speculative allegations" by Dr. Das Herbst, media spokesman for defence minister Gen. Magnus Malan.

While he would not comment on such allegations, said Dr. Herbst, "it is interesting to note that the allegations were dug up right on the heels of the most constructive visit by a South African state president ever."

ARMSCOR's [Armaments Corporation of South Africa] public relations spokesman, Mr. B. Retief, said "the so-called revelations were merely another rehash which has been going on for 12 years, and ARMSCOR simply has no comment on these allegations whatsoever."

The National Resources Defence Council [NRDC], an American environmental activist group, on Wednesday released pages of the CIA memo entitled "the 22 September 1979 event", which it obtained under the Freedom of Information law.

The memo—which has portions that have been blacked-out—discussed a nuclear test over unfrequented international waters in the southern hemisphere on September 22, 1979. The memo concluded South Africa was the most likely source, according to the group.

The NRDC stated the CIA memo thus "officially confirms for the first time the existence of South Africa's nuclear weapons programme and provides disturbing new details about it."

"South Africa's nuclear programme has never been officially documented or confirmed and its policy of secrecy and nuclear ambiguity has obscured essential facts," the group added.

The document was released publicly only a day after President F. W. de Klerk became the first South African head of government in 45 years to make an official visit to the United States.

### **Nation Seeks Nuclear Free Southern Africa**

#### **U.S., British, Soviets Consulted**

*MB1909112190 Johannesburg BUSINESS DAY  
in English 19 Sep 90 p 3*

[Article by Mike Robertson: "South Africa 'is Lobbying for Nuclear-Free Region'"]

[Text] SA [South Africa] is pushing for all southern African countries to sign the Nuclear Non-Proliferation Treaty (NPT) and hopes to get U.S., UK and Soviet support for a bid to make the region a "nuclear-free" area.

Since 1988 SA has come under strong pressure—particularly from the United States—to sign the NPT. This has been stepped up during recent months.

However, it is understood that SA has argued it could face a right-wing backlash if it signed the treaty without other southern African states giving a commitment to accede to the treaty.

In talks with NPT depositary states—the United States, UK and the Soviet Union—SA has indicated willingness to sign the treaty if similar commitments are made by Namibia, Angola, Mozambique, Zimbabwe, Tanzania and Zambia.

During the past nine months a series of meetings have been held between SA officials and representatives of the other six African countries.

Representatives of the three depositary states have also held meetings with the countries concerned with a view to getting all sevel in the region to sign the NPT.

In terms of the treaty, depositary states are countries in which a country joining the NPT deposits an instrument of accession.

Depositary states have an obligation to try to persuade non-members to sign the treaty.

During the meetings it emerged that most Frontline States did not want any decision on their part to sign the NPT to be seen in conjunction with a decision by SA to accede to the treaty.

Mozambique, however, deposited instruments of accession to the NPT on September 12.

This is seen by SA officials as a positive move and has raised new hopes that an arrangement can be reached whereby SA and the other countries identified will sign the NPT.

SA is looking to the United States, UK and USSR for further assistance to bring this about.

Countries which sign the NPT have an obligation not to produce nuclear weapons.

Within 18 months they have to conclude a comprehensive safeguard agreement with the International Atomic Energy Agency (IAEA).

If SA joins, all its nuclear installations will have to be opened to IAEA safeguard inspections.

NPT member countries also agree to exchange scientific and technical information on a bilateral basis.

### **Proposal Lauded**

*MB1909191290 Johannesburg International Service  
in English 1557 GMT 19 Sep 90*

[Station commentary: "A Nuclear Free Zone"]

[Text] In a dramatic bid to put an end to African fears about South Africa's nuclear intentions, Foreign Minister Pik Botha has proposed a nuclear-free zone for southern Africa. He says South Africa is ready to renounce the development of nuclear weapons by signing the Nuclear Non-Proliferation Treaty, if other countries in the region are prepared to do the same. This would immediately create a nuclear-free zone in the subcontinent.

The significance of the offer lies in its demonstration of South Africa's desire to promote a regional dispensation based on nonaggression and economic cooperation. For other countries in the region it would be merely a symbolic gesture, since none would, in any case, be capable of developing nuclear weapons for many years to come. But is it known that South Africa has the ability to manufacture such weapons.

The South African Government has also given the assurance that it has no wish to use its nuclear capacity for any but peaceful purposes. Until now, however, the international security situation, particularly in Soviet-dominated Eastern Europe, has complicated the question of signing the Non-Proliferation Treaty.

Last year's historic changes in Eastern Europe, and greater cooperation between the super powers, have made a reassessment possible. So South Africa is now ready to move on this issue. What would make it a truly

worthwhile breakthrough for all of southern Africa, and indeed for all of Africa, would be a similar commitment from others in the region, so that it could be created as a nuclear-free zone.

That is what Minister Pik Botha has now proposed. There could be no stronger demonstration of the commitment of Southern Africa to cooperation for the good of all its countries, and peoples, than such an action by their governments.

### Journal Discusses Spread of Missile Technology

90CM0345A Beijing GUOJI WENTI YANJIU  
[INTERNATIONAL STUDIES] in Chinese No 3,  
13 Jul 90 pp 29-36

[Article by Ye Ruan: "Ballistic Missile Proliferation—How Do We Control It?"]

[Text] *The proliferation of ballistic missiles is having a greater and greater impact on international and regional security. It is the product of long-term rivalry between the superpowers over world hot spots, and there are other complex factors involved. The main danger posed by missile proliferation is that it can exacerbate regional instability and promote the proliferation of chemical and nuclear weapons. There are serious flaws and loopholes in the agreement reached between the United States and a small number of other countries in order to limit proliferation, and little good has come of it. Optimism regarding the prospects for preventing further proliferation of missiles in the near future is not warranted. The way to resolve this problem is for the international community to work together to push comprehensive, fair, and reasonable resolutions to regional conflicts.*

On the last day of February 1988, Iraq and Iran began an intense "war of the cities." In a few short weeks the two countries launched hundreds of Soviet-made Scud-B missiles and other surface-to-surface missiles.<sup>1</sup> In Tehran alone, more than 2,000 civilians were killed, and half the city's population was forced to take refuge in security zones.<sup>2</sup> This was the first time since Germany viciously attacked London and Antwerp with V-2 rockets in World War II that such a large-scale missile attack was directed against residential areas.

On 22 May 1989, India announced its first successful test-firing of a Agni intermediate-range missile. It is reported that this missile has a maximum range of 2,500 kilometers and can handle an effective payload of 1,000 kilos. Indian Prime Minister Rajiv Gandhi announced that this missile was "extremely significant" and that it would "expand the range of security options open to India."<sup>3</sup>

Two months later, South Africa (with Israeli assistance) launched a rocket with a range of 900 miles into the Indian Ocean. This range was precisely the same as that of Israel's Jericho-2, which they had test-launched for the first time two years earlier. U.S. intelligence officials supplied new evidence in October of that same year which showed that the exhaust plume from the South African missile's booster rocket was strikingly similar to that of the Jericho II missile. It is said that the two countries had concluded an agreement in advance that Israel would provide missile technology to South Africa in exchange for uranium which they would use to develop nuclear weapons.<sup>4</sup>

All of the aforementioned developments occurred after the Missile Technology Control Regime had been

formed by seven Western nations in April 1987 (hereafter referred to as the "Seven Nation Agreement") and the Intermediate-Range Nuclear Forces Treaty had been signed by the United States and the Soviet Union in December of that same year. Precisely for this reason, the proliferation of ballistic missiles has caused a great deal of concern in the international community in recent years. It has been exerting a greater and greater impact on international security, especially in regional matters. This is an extremely complex international issue. Not only does it involve such political, military, economic, and technological factors as East-West arms control, regional conflicts, weapons production and sales, and scientific and technological development, it also affects bilateral and multilateral relations between large and small nations of every type. This article intends to provide a general description and analysis of the history, current status, and future prospects of ballistic missile proliferation.

#### I. The Product of Regional Rivalry Between the Superpowers

Ballistic missiles first appeared in the Third World in the late 1950's and early 1960's. The United States supplied Honest John short-range missiles to Greece, Turkey, South Korea, and Taiwan, while the Soviet Union shipped FROG-4 or FROG-5 short-range missiles to Algeria, Egypt, and other countries.<sup>5</sup> However, missile proliferation has been most severe in the Middle East, where strife has continued for the longest time, reached the highest intensity, and been the most complex.

The Middle East missile race began in the early 1960's. After Israel's founding, its military power developed rapidly, with vigorous support from the United States and other Western countries. It soon achieved superiority over the Arab countries. Israel launched a solid-fuel meteorological rocket called the Shavit in 1961, and it formulated a plan for developing missiles. In 1963 Israel secretly signed an agreement with Dassault Aircraft Corporation of France to buy that company's MD-620 and MD-660 missiles (with a 500-kilometer range, effective payload of 550 kilograms, and accuracy to within one kilometer). France prohibited shipment of the missiles after the third Middle East war in 1967, so Dassault was unable to deliver the goods according to schedule (1968).<sup>6</sup> However, it was said that two missiles had already been delivered to Israel prior to the embargo.<sup>7</sup> Later, Israel developed the Jericho-1 on its own and deployed it in 1968. It received assistance from some U.S. arms manufacturers in developing the warhead and the guidance system.

In order to counter Israel's military superiority and ensure national security, some Arab countries attempted, with assistance from foreign experts, to develop ballistic missiles, but they failed. In the early 1960's, Egypt's President Nasser hired 80 West German rocket specialists and developed three different missiles, but they never went into production. From 1974 to



1981, Orbital Transport und Raketen Aktien Gesellschaft (OTRAG), of Munich, made successive attempts in Zaire, Libya, Syria, Pakistan, and Saudia Arabia to develop a small commercial launch vehicle. For a variety of reasons, the company was not successful.<sup>8</sup> Faced with these circumstances, and due especially to the fact that the military power of the Arab nations was greatly reduced in the 1967 and 1973 wars, Egypt, Syria, Iraq, Libya, and South Yemen purchased about 1,000 FROG-7 (range, 70 km) and Scud-B (range, 280 km) missiles from the Soviet Union from the late 1960's through the late 1970's.<sup>9</sup>

In 1974 Israel demanded that the United States provide it with the Pershing 1a missile (range, 750 km), but was rejected.<sup>10</sup> However, in 1975 the United States promised to supply Israel with 200 Lance missiles, which it began to deliver the following year.<sup>11</sup> This missile had a range of 130 kilometers and could carry both conventional and nuclear warheads. At the same time, Israel set about developing the Jericho-2 missile, which it test-launched successfully in 1987. It used this rocket the following year to launch a satellite. In 1983 the Soviet Union shipped a batch of SS-21 missiles (range, 120 km) to Syria. Perhaps because U.S.-Soviet intermediate-range missile negotiations were nearing agreement by the mid-1980's, and because Soviet foreign policy was readjusted after Gorbachev came to power, the Soviet Union has not shipped such intermediate-range missiles as the SS-12 (range, 900 km) or the highly accurate SS-23 (range, 500 km).<sup>12</sup>

Because the United States and the Soviet Union stopped supplying their allies with the latest generations of ballistic missiles in the 1980's, the focus of the ballistic missile race in the Middle East (and in other regions) has gradually shifted from "lateral proliferation" (from the United States and the Soviet Union toward other countries) to "vertical proliferation" (within Third World countries which were already in possession of missiles), that is, they began to improve the missiles they already had (by increasing range, increasing effective payload, or improving accuracy) or to develop new missiles. The focus also shifted toward "lateral proliferation" between Third World countries. Because the missiles and missile technology possessed by the Third World come primarily from the Soviet Union or the United States, the armament plans and military industries of many countries (especially Israel and the Arab countries) are still seriously dependent on the United States and the Soviet Union (and a small number of other countries) in the areas of funds, technology, and personnel. This type of proliferation has still not escaped the orbit of superpower rivalry.

There are many complex reasons why ballistic missiles have appeared and proliferated in the Third World.

It is not primarily for economic reasons that the superpowers have sold missiles to the Third World; they have done so in order to achieve foreign policy objectives, for example, "influence allies, resolve regional conflicts in a way favorable to themselves, support the governments of friendly nations, counteract each other's influence, obtain the right to use facilities or bases, exert pressure on authorities in importing countries, and so on."<sup>13</sup> Calculated in terms of the 1985 U.S. dollar, Third World countries imported a total of \$286 billion worth of conventional weaponry between 1971 and 1985, 68 percent of which came from either the United States or the Soviet Union.<sup>14</sup> Among all categories of weapon systems, aircraft accounted for half of the imports. That proportion rises to roughly 70 percent after factoring in tanks and cannon. Missiles never accounted for a high percentage (about 10 percent in most years). Breaking down these figures by region, more missiles were imported in the Middle East and the Asian Pacific than in other regions.<sup>15</sup>

Enterprises in some developed Western countries, including France, West Germany, and Italy have transferred missiles and missile technology to Third World countries, primarily in search of high profits.

Situations in Third World countries and regions are complex and cannot be lumped together. Importing missiles, exporting missiles, or developing missiles on one's own or in cooperation with another country are all decisions taken for different reasons. The considerations involved include exerting political influence (toward a particular area or country); earning hard currency; bolstering military strength in order to become a military power with regional dominance; gaining missile vehicles to launch chemical weapons or, potentially, nuclear weapons when the need arises; strengthening defenses and counterattack capabilities or acquiring a deterrent force; serving as a symbol of national power and prestige; developing space aviation industry and spurring the development of the country's high technology and economy; and so forth.

The historical background described above, which takes the Middle East as an illustration, shows that missile proliferation in the Third World is a product of long-term superpower rivalry in the world's hot spots. This is demonstrated more directly and clearly in some regions and less directly and to a lesser degree in others.

## II. Current Situation and Potential Dangers of Missile Proliferation

So far about 20 or 30 Third World countries (and territories) have or are developing ballistic missiles (see table).

## Third World Ballistic Missile Proliferation

	40-50 km <sup>1</sup>	150-600 km	Over 600 km
Afghanistan		Scud-B	
Algeria	FROG-7		
Argentina		Condor I	Condor II
Brazil	ASTRO II SS-60; EE-150*	SS-300*; Sonda-4*	
Cuba	FROG-4; FROG-7		
Egypt	FROG-7; Saqr-80	Scud-B	Badr-2000* <sup>2</sup>
India		Prithvi	Agni
Indonesia	RX-250*		
Iran	Oghab; Shahin-2*; Nazeat (Iran-130)*	Scud-B	
Iraq	FROG-7; ASTROS SS-60	Scud-B; Al-Husayn	Al-Abbas*
Israel	MAR-350; Lance	Jericho-1	Jericho-2
Korea (North)	FROG-4; FROG-7	Scud-B	
Korea (South)	Honest John; Nike-Hercules <sup>3</sup>		
Kuwait	FROG-7		
Libya	FROG-7	Scud-B; ex-OTRAG	
Pakistan	Haft-2	Haft-1*	
Saudi Arabia	ASTROS SS-60		Dong Feng-3 (CSS-2)
South Africa	<sup>4</sup>		
Syria	FROG-7; SS-21 Scarab	Scud-B	
Taiwan	Honest John; Ching Feng		
North Yemen	SS-21 Scarab <sup>4</sup>		
South Yemen	FROG-7; SS-21 Scarab	Scud-B	

Note: The asterisk (\*) indicates that the missile is currently under development.

1. Missiles with a range of 40 km or less are generally classified as rocket artillery. Most of the world's armies have this kind of missile.

2. This is the Egyptian name for the Condor.

3. This is a U.S.-supplied surface-to-air missile. It was modified to attack surface targets without U.S. consent.

4. Unconfirmed.

Source: *Strategic Survey*, 1988-89, p. 18 (London, International Institute for Strategic Studies).

Most of the missiles listed in the first category were imported directly from the United States or the Soviet Union in the late 1950's and early 1960's. Most of the missiles in the second category are Scud-B's or improved versions of it bought from the Soviet Union in the 1970's. There are also many missiles that various countries are developing or have developed on their own. Apart from a small number of Saudi Arabian missiles, all of the missiles in the third category are intermediate—or intermediate/long-range missiles developed in the 1980's by the various nations. India's Agni missile and South Africa's missile have recently been test-launched successfully. Israel's Jericho-2 has been test-launched several times and development is proceeding apace.

In terms of regional distribution, ballistic missiles are concentrated mainly in three regions: the Middle East, the Indian subcontinent, and the Korean peninsula. One-half of all Third World ballistic missiles are in the Middle East. *Jane's Strategic Weapons Systems*, published in May 1989, reports that there are 20 types of

ballistic missiles in Third World countries, of which 11 have already been deployed or are presently being developed. At least six countries are considered capable of producing nuclear warheads.<sup>16</sup>

Ballistic missiles have been used four times in regional conflicts.<sup>17</sup> During the Middle East war in October 1973, Syria and Egypt launched a small number of FROG and Scud missiles against military bases in northern and southern Israel. During the Iran-Iraq war, Iraq launched a small number of short-range missiles against Iranian border towns at the beginning of the war. Iraq launched over 100 Scud-B missiles between 1983 and 1986 against more distant targets. Iraq attacked Iraq in the same manner after acquiring the same missile from Libya in 1985 until the "war of the cities" broke out between the two nations in the spring of 1988. Libya took revenge on 15 April 1986 for the U.S. air raid by launching two Scud-B missiles against a U.S. Coast Guard base on the coast of Italy. They missed the target. The most recent incident was in late 1988 when Afghan government

troops fired over 50 Scud-B missiles against Afghan guerrillas. Experience shows that using ballistic missiles equipped with conventional warheads does not have a decisive impact on the course of a war, whether used against military targets, industrial facilities, or civilian populations.

The main danger posed by ballistic missile proliferation is not the fact that the number of countries is gradually rising, nor is it that the number of missiles has gone up greatly. In fact, only two or three new countries have obtained missiles in recent years (Saudi Arabia, Afghanistan, South Korea). Missiles constitute only a small part of the military force of Third World countries and are not likely to constitute the primary threat. Although all of Israel's neighbors (except Jordan) have ballistic missiles, Israeli military officials believe that "the genie is not yet out of the bottle," and that missiles are a potential rather than current problem.<sup>18</sup> The two main potential threats posed by accelerated proliferation of ballistic missiles are:

#### 1. Exacerbation of Regional Instability

As described above, the great majority of all nations that have ballistic missiles are in a few hot spots that have long been in chaos, strife, and occasional open conflict. The superpowers have not terminated their rivalry in these hot spots (though the degree and methods have changed) but their ability to control events has shrunk greatly. In late June 1986, the United States and Israel signed an agreement to jointly develop the Arrow anti-tactical-ballistic missile (the United States agreed to provide 80 percent of the funds and Israel 20 percent).<sup>19</sup> Last March, U.S. Defense Department officials revealed that the United States had already decided to sell the Patriot antimissile system and that it would be deployed next year. This will enable Israel to acquire antimissile capability much earlier.<sup>20</sup> This can only intensify the escalating arms race in the Middle East.

2. The proliferation of ballistic missiles has spurred proliferation of chemical and nuclear weapons and has threatened international security and peace.

Several countries now developing a new generation of missiles are precisely those nations that are considered "threshold countries" possessing the potential to produce nuclear weapons. In recent years, and especially in the Middle East, the proliferation of ballistic missiles appears to have been increasingly linked to the proliferation of chemical and (potentially) nuclear weapons. Some Arab countries are unwilling to relinquish the right to produce nuclear weapons and apparently intend to use them as a "poor man's atom bomb" to deter any possible attack by Israel. It is foreseeable that if a fifth Middle East war were to break out, it would surely far surpass the previous four in terms of scope and intensity. If ballistic missiles were used as the vehicle for a chemical war or to attack nuclear installations, it would have disastrous consequences not only for the Middle East but for world peace in general.

#### III. International Efforts To Control Proliferation Yield Few Results

After 1972, the United States began restricting exports of ballistic missiles and relevant technology in a manner similar to that adopted later by the "Seven Nation Agreement." The United States took this unilateral action for three reasons. One was in order to protect its superiority in aerospace industry and technology and to fend off foreign competition.<sup>21</sup> More and more countries were accelerating development of aerospace industry and technology. In particular, Japan and some West European countries were engaging in more and more cooperation and contracts in this area with Third World countries. By controlling exports of ballistic missiles, they would be able to control the transfer of cutting-edge technology, an area in which the United States held the lead. A second reason was that more and more Third World countries and territories were acquiring and improving ballistic missiles. This posed an increasing threat to overseas U.S. troops and U.S. allies.<sup>22</sup> Particularly in the Middle East, Israel's pursuit of invasive and expansionist policies (with U.S. support) forced the Arab nations to strengthen their defenses, and this effort included importing and developing ballistic missiles. If war were to break out in the Middle East, the United States would back Israel, and U.S. troops and installations in the Mediterranean and the Gulf region would certainly come under attack. The third reason is that the United States was concerned that ballistic missile proliferation would accelerate the proliferation of chemical and nuclear weapons.

The U.S. Government gradually came to see that proliferation of ballistic missiles in the Third World was disadvantageous to itself. In November 1982, President Reagan signed National Security Decision Directive 70, which called for the United States to find a way to fight "this dangerous trend."<sup>24</sup> However, by the 1980's space and missile technology had already come into widespread use and dissemination. It was impossible for unilateral controls by the United States to be effective. In 1983 the United States, Britain, France, West Germany, Italy, Japan, and Canada began secret negotiations. After four years of talks, these seven nations reached agreement in Rome on 16 April 1987. The "Seven Nation Agreement" was officially named the Missile Technology Control Regime.<sup>25</sup>

The Seven Nation Agreement is divided into two parts: a set of guidelines for restricting exports, and an export control list.<sup>26</sup> The object of the agreement is to restrict the risk of nuclear weapon proliferation by controlling the transfer of nuclear weapons delivery systems other than manned aircraft, as long as these restrictions do not impede the space programs of the seven countries or hinder space cooperation between them and providing that such programs do not facilitate the development of nuclear weapons delivery systems. The most important part of the agreement is to subject the most "sensitive" items on the restricted list—category-one items—to tight controls. For the most part, export licenses for such



items are not issued. However, because of different laws and customs in the various countries, even these items are to be taken "on a case-by-case basis" and decisions are to be made by the signatory nations "in accordance with their own laws." Items in category two can be transferred freely in all but a few special cases as long as guarantees are made between governments.

Items in category one include:

1. Complete rocket systems with an effective payload of 500 kilograms or greater or a range of 300 kilometers or greater (including ballistic missile systems, space launch vehicles, and sounder rockets), and unmanned aircraft (including cruise missile systems, target aircraft, and unmanned reconnaissance aircraft).
2. Subsystems that can be used in the complete systems described above, or production facilities or equipment designed specifically for the purpose of manufacturing such systems.
3. All classes of individual rockets, reentry vehicles, rocket engines and solid or liquid fuels, guidance systems,<sup>27</sup> vector thrust-control devices, warhead safety and arming devices, as well as fuses and launching devices.

Most of the items in category two are production technologies that could facilitate production of large numbers of missiles many years from now, but do not present a great immediate threat. Such items include propellant production equipment, structural materials, avionics equipment, ground support equipment, testing equipment, computer software, and nine others.

In recent years, the Seven Nation Agreement has done little to prevent proliferation of ballistic missiles in the Third World. The international community universally considers the agreement to be "too little, too late." Some people believe that the agreement has been "completely counterproductive" and has actually spurred some Third World countries to accelerate missile development.<sup>28</sup> Many Third World countries and territories now have missiles and missile technology superior (in terms of range, effective payload, and accuracy) to what has been restricted in the Seven Nation Agreement. The Seven Nation Agreement can be considered a failure because it contains serious flaws and loopholes.

First, and most important, it is an agreement by which large nations restrict smaller ones, and developed nations restrict developing ones. It is not an international treaty formulated by a large number of nations after consultations based on equality. It lacks a broad constituency. The great majority of developing nations feel that the agreement is intended to maintain the technological superiority of supplier countries and to suppress the space programs of developing countries.<sup>29</sup>

Second, there are not many signatories to the treaty. Some countries which have, or could potentially have, ballistic missiles did not participate in the agreement. As

early as the beginning of the 1980's there were at least 100 developing countries engaged in space research, of which 39 had set up bilateral agreements with the United States on the use of outer space. Five of these countries had entered into such agreements with countries in Western Europe. About 20 countries by that time had their own space research agencies, and 16 countries had their own satellites or shared one with neighboring countries.<sup>30</sup> So far, in addition to eight countries that now have space capabilities (that is, the ability to launch satellites), seven or eight countries are now stepping up efforts to implement their own space launch programs. As everyone knows, the great majority of the technology, especially inertial guidance technology, is the same in intermediate-range missiles as in the space launch vehicles used to launch satellites. It is generally possible to buy civilian satellites as well as their components, technology, materials, and manufacturing equipment on the international market. Many developing countries already have considerable technological capability, and they can also hire specialists and engineers from Western enterprises. For this reason, the Seven Nation Agreement presents no major restrictions to most countries.

Third, the Seven Nation Agreement is not a document of international law with any real force. It is neither a treaty nor an administrative agreement. It provides no international organ for enforcement, nor has it any clause concerning verification or observance of its requirements. It provides for no sanctions against violators. All it did was to take a few regulations based on unilateral export restriction policies of the United States and turn them into a "gentleman's agreement" between a small number of countries.

After taking the above into account, one need not wonder at the fact that this sort of agreement has not had much impact upon an issue so complex as the prevention of ballistic missile proliferation.

In one classic example, from 1983 to 1988 the United States investigated sales by SNIA (a subsidiary of Italy's Fiat) of missile technology to Argentina in violation of the Seven Nation Agreement. These sales helped Argentina, Egypt, and Iraq in their joint development of the Condor II missile. Allan Fulman gave a vivid description of the inside story of this affair in his book *Arnelli and the Italian Power Network*.<sup>31</sup> People have seen how difficult it is to enforce the Seven Nation Agreement due to the fact that relations between the United States and other Western nations are intimately involved with political, military, diplomatic, scientific, and technological affairs. As the *FINANCIAL TIMES* pointed out, the agreement "has not received clear support from high-level officials in the governments of the majority of its signatories. Violations of the agreement by companies in the West (especially Europe) are rampant."<sup>32</sup> According to a recent news report from the American Broadcasting Company, Iraq already has the capability to produce an intermediate range nuclear weapon, and almost all of its equipment and technology is from Western companies, including companies from the United States. The U.S.



Department of Commerce has encouraged exports of technology to Iraq which could be used in a missile program.<sup>33</sup> Iraq's Minister of Military Industries said that Iraq had successfully test-launched two three-stage rockets last December which had been developed "without any foreign participation."

#### IV. How To Prevent Missile Proliferation

The U.S. Government has listed prevention of the proliferation of ballistic missiles (and chemical and nuclear weapons) in the Third World as one of the objectives of national security policy in the 1990's.<sup>34</sup> However, the United States admits that "it will become more and more difficult to slow the pace of this type of proliferation."<sup>35</sup> How can missile proliferation be prevented or effectively decelerated? Government officials and scholars in the United States and other Western nations have offered some ideas and suggestions.

1. Some have suggested that more nations need to participate in the Seven Nation Agreement. Since 1988 the U.S. Government has been attempting during visits and meetings with Soviet leaders and high-level officials to get the Soviet Union to join the Seven Nation Agreement. In accordance with the terms of the June 1988 summit meeting, high-level officials from the two countries met in Washington in late September that year to discuss the prevention of missile proliferation. Press reports from the United States indicated that the United States had briefed the Soviet Union on the worldwide status of ballistic missile proliferation. After the United States gave an overview of language in the Seven Nation Agreement aimed at limiting proliferation, both sides "reached a common understanding in some areas, particularly with regard to the seriousness of the issue." The United States hoped that the Soviet Union would at least use its influence to dissuade Middle East nations from buying or developing ballistic missiles.<sup>36</sup> In the past two years, the two sides have engaged in many discussions and meetings, but there has apparently been little progress.

The intention of the United States and other Western nations is to gain recognition of the Seven Nation Agreement from all nations so it will become a global treaty, just like the Nuclear Non-Proliferation Treaty.<sup>37</sup> This is not a feasible plan. Even if more nations joined the agreement, proliferation would still not likely be prevented. Although there is a connection between missile proliferation and nuclear nonproliferation, they are not completely the same. Outer space belongs to all of humanity. Every country has the right to develop space technology and to make peaceful use of outer space. Handling affairs in accordance with the Seven Nation Agreement is inevitably a matter of a small number of nations using the prevention of missile proliferation as an excuse to monopolize space industry and technology. The great numbers of developing countries are disappointed with the Nuclear Non-Proliferation Treaty. They have always been unhappy about the fact that nuclear nations which have signed the treaty have not

carried out their duty of nuclear disarmament. They have also been unhappy about the fact that these same nations have looked askance at the peaceful use of nuclear energy by nonnuclear nations. The developing nations have learned their lesson and will not sign an agreement that is not in their interests.

2. Some have suggested that the Seven Nation Agreement must be strengthened and amended. This should be done by including more types of technology in category one on the restrictions list, and imposing compulsory prohibitions on exports; amending the language of category two and making restrictions on these exports more strict. In addition, the language of the agreement must be made law in all countries, and it must be enforced. The formulation of on-site verification measures must also be considered in order to ensure that exported missile components and technologies are used for peaceful purposes.<sup>38</sup> On 1 February 1990, U.S. Secretary of State Baker testified in the U.S. Senate that the United States has already agreed with its allies to strengthen the Seven Nation Agreement by extending participation in the agreement to all members of the European Community and possibly the new governments of Eastern Europe. Not to mention how difficult it would be for this expanded number of nations to negotiate even stricter limitations, missile proliferation would still not be effectively prevented even if negotiations were successful.

3. Some people have suggested that the INF Treaty between the United States and Soviet Union be "globalized," that is, that the United States and the Soviet Union, in their Geneva disarmament talks, propose the formulation of a multilateral agreement which would prohibit the export of any intermediate-range missiles,<sup>39</sup> or that global or various regional agreements be formalized which would prohibit testing of ballistic missiles, thereby making it impossible for any country to develop new missiles.<sup>40</sup> These proposals are not feasible either politically or theoretically. No country would be willing to give up the fruits of its breakthroughs in science and technology, nor would any country relinquish its military power or willingly submit to the manipulations of a small number of major powers.

4. Some people have suggested developing an antitactical-ballistic missile system in order to render ballistic missiles "ineffective and obsolete." Soon after President Reagan launched the Strategic Defense Initiative [SDI] in 1983, he signed agreements with some allies for joint development of an antimissile system (originally for the purpose of defending against the threat posed by the Soviet Union's tactical nuclear missiles in Europe). In 1985 Dan Quayle (then a U.S. senator, now the vice president) argued that the United States should provide regional allies with an antitactical-missile system (he later asked the Congressional Research Service to produce a report on the proliferation of ballistic missiles in the Third World for this purpose). George Bush endorsed this proposal in a campaign speech in September 1988. Now, in addition to the United States and

Israel, antitactical-missile systems are also being developed in some other Western nations, the Soviet Union, and Japan.<sup>41</sup> It is a certainty that U.S. assistance for Israel's development of an antitactical-missile system will spur the Arab countries to further improve the sudden-strike capability of their ballistic missiles. Several decades of the U.S.-Soviet arms race have provided ample proof that the race to develop new offensive and defensive weapons is an endless cycle of "action and reaction."

These proposals cannot effectively curb the proliferation of ballistic missiles in the Third World. There is no cause for optimism regarding the prospects for curbing proliferation in the near future. The international community has yet to find a truly effective method to achieve this purpose. However, there is no need to exaggerate the seriousness of the situation either, as if all hope for controlling ballistic missile proliferation in the Third World were lost. In fact, just as with nuclear arms proliferation, ballistic missile proliferation is subject to political, economic, and technological constraints. Take the technological aspect, for example. If you want to manufacture guidance systems—the part of ballistic missiles with the stiffest technological requirements—you must produce accelerometers, gyroscopes, and flight computers. The performance of the inertial guidance system must be up to standard in every aspect. Extremely precise machining, special materials, and microcomputers are required. It would be extremely difficult for the great majority of developing countries to reach this level of technological and manufacturing advancement.

The prevention or deceleration of ballistic missile proliferation in the Third World will require a resolution of regional conflicts. In other words, the sources of proliferation—superpower interference and rivalry, regional conflicts and antagonisms, and various destabilizing factors—must be eliminated. There has been a relaxation of international tensions in recent years. There has been progress in disarmament and arms control negotiations, and noticeable successes have been achieved in efforts to find political settlements to regional conflicts. This facilitates efforts to prevent ballistic missile proliferation. However, it must be noted that the aforementioned destabilizing factors still exist, and new turmoil and destabilizing factors have appeared in some regions. For this reason, the only real way to prevent ballistic missile proliferation in the Third World is to resolve regional conflicts in a comprehensive, fair, and rational manner. The international community should make an unflagging effort to achieve this goal.

All countries could, on the basis of equality and under the auspices of the United Nations, explore effective ways to prevent ballistic missile proliferation in the Third World, but they absolutely cannot take the Seven Nation Agreement as a fait accompli and force other countries to accept it. In regions such as the Middle East where proliferation is serious, the various countries should put top priority on regional peace and security

and work together to prevent proliferation. Egypt's President Mubarak recently made a very meaningful proposal, asking for a comprehensive ban on weapons of mass destruction in the Middle East. He also called for the establishment of a system for verifying the presence of nuclear, chemical, and biological weapons. If this proposal receives a positive response from other Middle East nations, especially Israel, it will surely help to limit ballistic missile proliferation in the Middle East. Iran and Iraq have both expressed a willingness to carry out direct peace talks, and are even considering a meeting between their heads of state in order to improve relations. This is also a positive development.

#### Footnotes

1. The two sides launched a total of 570 missiles. Of this number, 190 were modified Scud-B missiles launched by Iraq. Iran launched more than 80 Scud missiles and 250 of their own Oghab missiles. See *Strategic Survey, 1988-89*, p. 19 (London, International Institute for Strategic Studies, 1989).

2. THE LOS ANGELES TIMES, 31 July 1988, p. 1.

3. AP wire from New Delhi, 22 May 1989.

4. The U.S. *Arms Control Today*, November 1989, p. 30; CHINA DAILY, 28 October 1989, p. 8.

5. *Jane's Weapon Systems, 1983-84; Balance of Military Forces, 1983-84* (London, International Institute for Strategic Studies); Aaron Karp, "The Frantic Third World Quest for Ballistic Missiles," in BULLETIN OF THE ATOMIC SCIENTISTS, June 1988, p. 19.

6. DEFENSE AND FOREIGN POLICY WEEKLY, 3-9 August 1987, p. 1.

7. INTERNATIONAL HERALD TRIBUNE, 26 July 1969.

8. Aaron Karp, "Ballistic Missiles in the Third World," in INTERNATIONAL SECURITY, winter 1984-85, pp. 185-87.

9. BULLETIN OF THE ATOMIC SCIENTISTS, June 1988, p. 17.

10. Jonathan Power, "Missile Technology Is Out of Control," BALTIMORE SUN, 18 August 1989.

11. *Balance of Military Forces, 1976-77*, p. 94 (London, International Institute for Strategic Studies).

12. The U.S. BULLETIN OF THE ATOMIC SCIENTISTS, June 1988, p. 17.

13. ATLANTA CONSTITUTION, 12 July 1988, p. 15.

14. Michael Olson, *Arms Transfers to the Third World, 1971-85*, p. 1, Stockholm Institute for International Peace (Cambridge University Press, 1987).

15. Ibid., p. 9.

16. David White, "At Least 16 Non-Western Nations Have Missiles," England, THE FINANCIAL TIMES, 17 May 1989.

17. *Strategic Survey, 1988-89*, p. 19 (London, International Institute for Strategic Studies, 1989).

18. CHRISTIAN SCIENCE MONITOR (INTERNATIONAL EDITION), 25-31 July 1988, p. 7.

19. THE WASHINGTON POST, 29 June 1989, p. 1.

20. The LOS ANGELES TIMES, 9 March 1989.

21. Aaron Karp, "The Frantic Third World Quest for Ballistic Missiles," p. 17.

22. U.S. Congressional Research Service Report No. 86-29 SPR: "The Potential for Ballistic Missile Proliferation in the Third World," p. 6, 24 April 1986.

23. Frederick Hulling, "The Missile Technology Control Regime: a Major Arms Control Success," in U.S. Arms Control and Disarmament Agency, *World Military Expenditures and Arms Transfers, 1987*, p. 25.

24. THE WASHINGTON POST, 19 September 1988, p. 6.

25. According to a report in the 3 February 1990 FINANCIAL TIMES, the seven nations had already unofficially and secretly implemented the regime before agreement had been reached. Spain has since signed the agreement.

26. White House press releases: "Missile Technology Control Regime," "Appendices on Equipment and Technology," 16 April 1987.

27. This refers to missiles with effective payloads and ranges greater than the weapons in category one, and those with guidance systems that provide a Circular Error Probable (CEP) of 10 kilometers or less. Guidance systems for missiles with ranges of 300 kilometers or less are not subject to restrictions. See U.S. Arms Control and Disarmament Agency, *World Military Expenditures and Arms Transfers, 1987*, p. 26.

28. "The Missile Race Heats Up," in SOUTH MONTHLY, August 1989.

29. Ibid.

30. Aaron Karp, "Ballistic Missiles in the Third World," in INTERNATIONAL SECURITY, winter 1984-85, p. 178.

31. Allan Fulman, *Arnelli and the Italian Power Network*, Chapter 15, "Missile Events," pp. 221-234 (Harrap, London, 1988).

32. Editorial in England's THE FINANCIAL TIMES, 13 February 1990.

33. UPI English Cable, Washington, 16 March 1990.

34. Presidential "American National Safety Strategy Report," p. 2, (White House, March 1990).

35. Ibid., p. 6.

36. INTERNATIONAL HERALD TRIBUNE, 28 September 1988.

37. Sipulin Baker, Countering Third World Guided Missile Threat, "Heritage Foundation Background Materials," No. 726, 21 September 1989, p. 9.

38. Aaron Karp, "The Frantic Third World Quest for Ballistic Missiles," carried in U.S. BULLETIN OF THE ATOMIC SCIENTISTS, June 1988, p. 20.

41. *Strategic Survey, 1988-89*, p. 24 (London, International Institute for Strategic Studies).

#### First Pulse Reactor Successfully Developed

HK1010030190 Beijing ZHONGGUO XINWEN SHE in Chinese 1136 GMT 9 Oct 90

[Report: "China Has Successfully Built Its First Pulse Reactor"]

[Text] Chengdu, 9 Oct (ZHONGGUO XINWEN SHE)—China's first pulse reactor was recently built at the Southwest Reactor Engineering Research and Design Institute. Following the United States, China is the second country in the world mastering the techniques of designing and building this new type of reactor.

The Southwest Reactor Engineering Research and Design Institute under the China Nuclear Industry Corporation designed and built the reactor on their own, and all the equipment and instruments needed were developed and produced in the country. It took research workers involved in the work 10 years to solve all the difficult problems relating to special fuel, design, and production of components, pulse parameters, measurement techniques, theory of design, and calculation procedures.

The pulse reactor is useful in producing neutron photographic isotopes, irradiation tests, physical experiments, and research on safety of the dynamic pile state. It will also help train students and find wide application in industrial and agricultural production, national defense, scientific research, and medical development.

## INDONESIA

**Nuclear Experts To Study at FRG Institute***BK2109120990 Jakarta ANTARA in English 1008 GMT  
21 Sep 90*

[Text] Jakarta, Sep 21 (OANA-ANTARA)—The National Atomic Energy Agency (Batan) will send seven nuclear experts to the Nuclear Power International (NPI) in the Federal Republic of Germany to study and develop Advanced Pressurized Water Reactor (A-PWR). The sending of these experts was in connection with the country's plan to set up a nuclear generating power plant, Batan's deputy director general for Nuclear Science and Technology Studies, Iyos Subki, told reporters here on Friday [21 September].

At least 300 experts will be needed for the operation of a 600 megawatt-capacity nuclear generating power plant, Mursid Jokolelono, the head of the Nuclear Study Center.

Iyos Subki said a feasibility study plan was still being worked out at present but Indonesia has set a target to construct it up in 1996 or 1997 in a location in the Muria Peninsula near Jepara, Central Java. The plant is expected to be operational by the year 2003, he added.

An NPI representative, K. Pernstich, said the NPI would bear the cost of study for the the seven Indonesian experts. The Indonesian experts who will learn in Germany and France will get an experience and an opportunity for the development of an A-PWR design which the NPI has offered to be used in the development of the Indonesian nuclear generating power plant.

The NPI, which is a cooperation project between German Siemens and French Framatome, has had an experience in the development of [words indistinct]. Besides NPI, according to him, there is still another company which has offered partnership, namely the Westinghouse from the United States.

The A-PWR is a low-risk design of a nuclear power generating plant so that its application is very safe. It only has a probability risk of one accident in million years, Subki said.

## JAPAN

**Nakayama Seeks Inspection of North Korean Facilities***OW1909131590 Tokyo KYODO in English 1242 GMT  
19 Sep 90*

[Excerpt] Tokyo, Sept. 19 KYODO—Japanese Foreign Minister Taro Nakayama said Wednesday international pressure should be applied to North Korea so it will accede to mandatory inspections of its nuclear facilities and ensure that it is not building nuclear weapons, Foreign Ministry officials said.

Nakayama made the remarks in a 30-minute meeting with Australian Prime Minister Bob Hawke after Hawke told him Australia is concerned about the prospect of Pyongyang's development of a nuclear weapons capability.

"Countries of the world should cooperate in exerting international pressure on North Korean to accept inspections," Nakayama was quoted as saying.

North Korea is a signatory to the Nuclear Non-Proliferation Treaty, but has yet to open its nuclear facilities to inspection by the International Atomic Energy Agency (IAEA) as required of all treaty signatories. [passage omitted]

**Experts To Be Sent to PRC Nuclear Station***OW1410114290 Tokyo KYODO in English 1118 GMT  
14 Oct 90*

[Text] Tokyo, Oct. 14 KYODO—The Japanese Federation of Electric Power Companies has decided to send three experts on nuclear power generation to China in December to offer technological advice and guidance for China's first atomic power generation, industry sources said Sunday. The federation responded to China's request for such Japanese experts for the 300,000-kilowatt pressurized water reactor nuclear power station, the sources said.

China plans to start operation of the Qinshan nuclear power station in Haiyan Prefecture in Zhejiang Province south of Shanghai in the autumn of next year, the sources said.

China started to build the first reactor at the nuclear power station in 1984 and the work is almost completed. Fuel rod is expected to be inserted probably next February for the planned start of operation in autumn, the sources said.

The three Japanese experts will be selected from the Hokkaido Electric Power Co., Kyushu Electric Power Co., and the Japan Atomic Power Co., the sources said.

China reportedly has strong expectations in atomic power generation to cope with the chronic shortage of electricity under the current industrial modernization. Construction is under way on the first and second pressurized water reactors with capacity of 900,000 kilowatts each in Guangdong Province.

China has also disclosed an additional plan to build two more reactors of the same type, with capacity of 600,000 kilowatts each, in the Qinshan area of Zhejiang Province.



## NORTH KOREA

### U.S. Request on Nuclear Safeguards Assailed

SA 9710054090 *Pyongyang Domestic Service in Korean*  
0025 GMT 7 Oct 90

[NODONG SINMUN 7 October commentary: "Aggressor's Brigandish Request"]

[Text] U.S. Ambassador to South Korea Gregg has revealed the U.S. attitude of not hoping for improved relations between the DPRK and the United States, and of continuously pursuing a nuclear strategy.

Gregg reportedly babbled that it is a precondition for improving DPRK-U.S. relations for us to sign a safeguard agreement that accompanies the Treaty on the Non-Proliferation of Nuclear Weapons. He said unless we sign a safeguard agreement, relations between us and the United States cannot improve. This is a tyrannical attitude and an unforgivable provocative statement designed to force upon us an unreasonable precondition on relations between the DPRK and the United States.

Gregg tried to lead the world into mistakenly believing that we refuse to sign a safeguard agreement. This is not true. One signs the Treaty on the Nonproliferation of Nuclear Weapons and a safeguards agreement that accompanies this treaty, in a word, to remove nuclear threats and ensure peace and stability. Therefore, we signed this treaty and have made efforts to sign a safeguards agreement. This is a clear manifestation of our antinuclear, peace-loving position.

It is the United States that is making nuclear threats on the Korean peninsula. The United States deployed more than 1,000 nuclear weapons and their carrying devices in South Korea, mapped out a nuclear war plan, and endlessly conducted the "Team Spirit" joint military exercise and other nuclear war exercises in an effort to implement this plan, thus posing grave nuclear threats against us. In resolving the issue of signing a safeguards agreement under these circumstances, the issue of removing U.S. nuclear threats against our Republic is raised as an essential and prerequisite demand. If only the United States removes its nuclear threats against us, the issue of signing a safeguards agreement can be resolved immediately. We have already made this position clear.

The fact that, even while not trying to remove nuclear threats against us, the United States unilaterally demanded that we sign an safeguards agreement is shameless. The fact that Gregg made this unreasonable request as a precondition for improving relations between the DPRK and the United States is nothing but an episode that discloses his brigandish nature as an aggressor. Frankly speaking, this is tantamount to the declaration that the United States does not want the improvement of relations between the DPRK and the United States and that it would further strengthen its nuclear war strategy against the Korean people.

Whether progress can be made in improving relations between the DPRK and the United States, in essence, depends upon the United States, which has based numerous U.S. troops and nuclear weapons in South Korea. If the danger of nuclear war is to be removed and if peace is to be maintained on the Korean peninsula, first of all, U.S. troops and nuclear weapons must be withdrawn from South Korea. This will pave the road toward improving relations between the DPRK and the United States and solving the Korean problem. The United States must make clear its position on the issue of ensuring security for our Republic.

If it genuinely hopes for peace and the alleviation of tension on the Korean peninsula, it must produce a timetable for the withdrawal of U.S. troops and nuclear weapons from South Korea, must stop conducting the "Team Spirit" nuclear war exercise, and must abandon its divisionist and war policies against the Korean people. The United States must clearly know that it will gain nothing from its nuclear blackmail against our people.

### Kim Denies Nuclear Weapons Program

OW2609130990 *Tokyo KYODO in English* 1204 GMT  
26 Sep 90

[Text] Myohyangsan, North Korea, Sept. 26 KYODO—North Korean leader Kim Il-song said Wednesday that Pyongyang has no intention of manufacturing nuclear weapons.

"We neither have the economic capability nor the will and ability to produce nuclear weapons," Japanese sources quoted Kim as saying in a meeting with former Japanese Deputy Prime Minister Shin Kanemaru and Makoto Tanabe, vice chairman of the Japan Socialist Party at this mountain resort area 150 kilometers north-east of Pyongyang.

Kim told the Japanese that the only nuclear facility in North Korea is an atomic power research center built by the Soviet Union in the past.

Kim gave no direct response when asked by the Japanese side why North Korea, a signatory to the Nuclear Non-proliferation Treaty, has yet to open its facilities to inspection by the International Atomic Energy Agency (IAEA) as required of all treaty signatories.

"If we are subject to inspection then the same should apply to (South Korea) where it is said there are 1,000 nuclear bombs," Kim was quoted as saying.

Despite North Korea's consistent denials that it is developing nuclear arms, Western intelligence and photographs from Western spy satellites have shown that research on nuclear weapons is expanding rapidly, Western analysts said.

Since 1989, the South Korean press and U.S. publications on military affairs have quoted U.S. intelligence reports as saying that a nuclear processing facility is

under construction in the Yeongbyeon Region in North Korea. They also noted that a 300,000-kilowatt plutonium producing plant is in full operation, with the capacity to produce materials needed to make a 1-kiloton-class atomic bomb.

Some reports have said a nuclear test site is adjacent to the nuclear plant.

Growing concern over North Korea's nuclear capability has resulted in calls by the United States and the Soviet Union urging North Korea to accept IAEA inspections.

North Korea has repeatedly criticized the U.S. nuclear threat and called for the establishment of a nuclear-free zone in the Korean peninsula.

## INTRABLOC

### Agreement With CSFR on Nuclear Cooperation

LD2109104190 Budapest MTI in English 1007 GMT  
21 Sep 90

[Text] Budapest, September 21, 1990 (MTI-ECONews)—Mr. Gyorgy Vanda, deputy chairman of Hungary's National Nuclear Energy Committee, and Karel Wagner, the head of the Czechoslovak Nuclear Energy Committee, signed an agreement at the annual meeting of the International Atomic Energy Agency [IAEA] in Vienna concerning closer cooperation between the two countries in matters of nuclear security and information.

The agreement is of particular importance for Hungary because of the Czech nuclear power stations already operating or being built near the border with Hungary.

After the Chernobyl disaster, several multilateral cooperation agreements were signed by IAEA members pledging information and assistance in the event of a nuclear accident and both Hungary and Czechoslovakia joined these agreements.

The new agreement supplements this general agreement and contains specific obligations such as informing the other country of any nuclear programme, planned and functioning nuclear facilities and the results of routine radiation checks in the area of nuclear power plants.

## CZECHOSLOVAKIA

### FRG, U.S. Firms Offer Nuclear Power Equipment

AU2709143490

[Editorial Report] Prague HOSPODARSKE NOVINY in Czech on 19 September on page 2, under the title "Westinghouse vs. Siemens," publishes a 450-word "rs"-signed report on the interest being shown by the American Westinghouse Electric and the German Siemens companies in cooperation with the Czech Skoda enterprise in constructing and supplying the technical equipment for the nuclear power industry in the Czech and Slovak Federal Republic. According to the report, the major reason for the interest is the fact that neither of the giant companies can expect to build a nuclear power plant at home for quite some time.

"RS" notes that a news conference took place in Prague (no date given) at which John B. Yasinsky, vice president of the Westinghouse Power Production Division, was present. According to the report, nothing new was said, "but already the concretization of the offer to Skoda, and thus to the whole of Czechoslovakia, is worth mentioning. The Westinghouse company is offering a transfer of complete nuclear technology, from the construction of nuclear power plants to the processing and storing of nuclear fuel. It does not want to produce only nuclear reactors and accessories in cooperation with

Skoda but also equipment for conventional power stations and, in the event that Westinghouse receives the order for the control and command system of the Mochovce nuclear power plant, then Skoda will get the order for the conventional turbines and generators immediately."

The author of the report also asked Eberhard Schomer, director of the KWU [expansion unknown] Gruppe of Siemens AG, "i.e., the branch manufacturing power producing equipment," for his comments. This gentleman, according to the report, argued for using well-tested equipment, preferably from the FRG.

The report concludes with the observation that both companies have presented their offer and now it is up to the ministries, enterprises, and the legislators in the CSFR.

### General Public Should Decide on Nuclear Power

AU2609141390 Prague MLADA FRONTA DNES  
in Czech 20 Sep 90 p 2

[Zdenek John commentary: "Two Faults in the Principle"]

[Text] The nuclear power plant in Bohunice has two faults that are used by its opponents as their most powerful weapons in the sharp polemics. First, as far as seismicity is concerned, it is built in the second least suitable location for a nuclear plant in Czechoslovakia. Only one area near Komarno is worse off with regard to the potential earthquake. The second fault, described last week by Minister Josef Vavrousek as a principal one, lies in the fact that the concept of the Bohunice-type blocks is antiquated. A lot of water has passed under the bridge since the concept was formed in the middle of 1960's, and a lot of knowledge was acquired in the area of safety in the nuclear power production.

It is neither the end of our days nor of the expert-commission visits to Bohunice. Nevertheless, all signs indicate that the weakest link in the Czechoslovak nuclear chain will not only survive the New Year but a few months on top of that. The federal government is of the opinion that although the risk of running two blocks of the power station V-1 is higher than usual in the world, it is acceptable under our conditions.

I believe that every comparison in the case of nuclear power production is necessarily lame. The statistical calculations proving a much higher danger in automobile transport (because hundreds of people die regularly weekend after weekend on the roads) simply cannot be considered as conclusive proof. The peculiarity of nuclear power is that it has always engendered more concern than any other human activity. Precisely that is the reason that the significant problems in this area should always be dealt with by all involved. The experts should explain to the laymen all possibilities, and the laymen should then tell the experts which of the possibilities they chose.

It is true that at Thursday's [13 September] press conference Minister Josef Vavrousek accepted personal responsibility for the decision to continue with the power production in Jaslovske Bohunice, but prior to that he got the blessing of the other government members at the session of the federal government. Hence, one can draw the conclusion that the fate of the nuclear plant and therewith also the acceptable maximum risk was decided in government circles. The decision was made by a close circle of experts without asking for the opinion of the lay public.

It is interesting that with much less hazardous steps the government (actually some of its ministers) comes to explain to, let us say consult, the parliament. This was, for instance, the case with increasing the price of gasoline. The step deciding on the limits on the operators of nuclear plants, however, was not accorded this "honor."

I intentionally do not call for a referendum because the talk about it, so far, in Czechoslovakia has been only theoretical. Obviously this is because there is not much of a tradition of referendums, and also because there are still no clear legal regulations for them. Nonetheless, I believe that it is a principal error that in its dealing with the nuclear power issue the government did not utilize the parliament elected by almost all citizens.

## HUNGARY

### Nuclear Safety Agreement Signed With FRG

LD2609183690 Budapest MTI in English 1742 GMT  
26 Sep 90

[Text] Budapest, September 26 (MTI)—A bilateral Hungarian-German agreement was signed in Budapest on Wednesday on cooperation in nuclear safety and preventing radiation.

Similar to other agreements in this area, the new accords with the FRG states that the sides will notify each other of any accident in their nuclear power plants, and exchange information of nuclear programmes and new legislation in the area of nuclear safety which affects people and the environment.

They will also pool experience gained during the building and operation of nuclear reactors, and inform each other about measures concerning the limitation of radioactive agents in their countries.

The agreement would help Hungarian nuclear safety culture and standards keep abreast of international development.

## POLAND

### Industry Minister on Polish Nuclear Plant Freeze

AU2409103390 Warsaw ZYCIE WARSZAWY in Polish  
19 Sep 90 pp 1, 4

[Interview with Tadeusz Syryjczyk, minister of industry, by Malgorzata Pokojka; place and date not given: "Calculations With Energy"]

[Excerpts] [Pokojka] Why exactly has it been decided to stop building Zarnowiec [nuclear power plant]? Are the economic arguments stronger than the ecological ones?

[Syryjczyk] The following factors influenced the government's decision: the state energy balance, the profitability of investment, and the safety of the future plant. Tests carried out by the ministry reveal that it is possible to stabilize the energy balance until the year 2000, and to reduce carbon dioxide emission without building any nuclear plant.

[Pokojka] For years we were frightened with possible energy cuts and cold apartments. Is that a change in politics, or a change in the energy industry?

[Syryjczyk] There is no doubt that the energy industry is in recession. Energy needs have sunk because of a fall in industrial output. Taking the reduced energy-intensiveness of industry into account, one suspects that in future, output will rise faster than the demand for energy. Apart from that, there are enormous reserves inherent in conventional power stations and the distribution network if they are modernized, and especially if the energy that is presently being produced is better utilized. As far as the immediate future is concerned, large stocks of coal have been amassed in power stations, and these stocks should stabilize energy prices. There should be no energy cuts in winter. [passage omitted]

[Pokojka] But Zarnowiec is a project that has already been started. Some of the money allocated to it has already been spent. Stopping the project will cause losses.

[Syryjczyk] Some of the work and money that has already gone into the project may be recovered following an investigation, but we do not know how much. When I took office, it seemed that Zarnowiec would meet European safety criteria with only a minimum of changes. We invited in Western firms to conduct a survey, especially the Belgian Belgatom, which is only a consumer of nuclear energy. It turned out that this type of reactor might indeed fulfill European safety criteria, but the present level of investment makes that impossible. Foreign and Polish experts presented a comprehensive catalog of changes concerning not just the automatic control system, which was unexpected, but also other spheres which had already been planned earlier. Implementing all these changes would have meant having to freeze investments for at least another year. The experts also think that not more than 30 percent of total outlay



has been spent so far. There is at least another \$1.5 billion to spend on this project.

[Pokojska] So what will happen to the Zarnowiec site?

[Syryjczyk] The laboratory that has already been built will be used the way it was planned. The site itself, which has already been prepared, and the railway link with the port, could be used as an industrial installation. The fate of this site has not been decided yet. We will decide in concert with the local authorities. I think there will be an auction in the end. I do not think the future owner or tenant will have any trouble with making good use of this site in accordance with environmental requirements.

[Pokojska] So after years of uncertainty, the Polish energy industry is going back to coal.

[Syryjczyk] A coal monopoly is not beneficial to the industry. We will try to abandon coal and make use of other sources, mainly gas. But for the time being, it is essential to increase coal extraction and find new foreign suppliers for it. [passage omitted]

## ROMANIA

### IAEA Experts' Discuss Cernavoda Plant

AU1210185990 Bucharest ROMPRES in English  
1805 GMT 12 Oct 90

[Text] Bucharest ROMPRES 12/10/1990—The experts of the Vienna-based International Atomic Energy Agency [IAEA] who had been asked to examine over September 21-October 12 the safety of the nuclear plant under construction at Cernavoda met on Friday for a press conference with Romanian and foreign journalists.

Mr. Ferdinand Franzen, head of the IAEA mission to Romania, specified on the occasion that, in a year, another mission was to come to Romania to verify the progress made, to make further suggestions and give new recommendations for the starting of the plant at Cernavoda.

The mission's main conclusions are written in a press communique which underscores, inter alia, that the Cernavoda project has the advantage of using well-advanced Western technology in keeping with international standards. The situation compares favourably with the situation in other East European countries. Romania has also appropriate nuclear safety regulations. But the project has the disadvantage of having been undertaken by a developing country with limited industrial and material resources and an inefficient and centralised bureaucracy.

The IAEA team proposed several measures to improve management of the project, showing that improvements should be made to meet international standards. That would be a great task for the Romanian Government and industry.

### Canadian Atomic Energy President Pays Visit

#### Roman Meets Energy Official

AU1510:21290 Bucharest ROMPRES in English  
1828 GMT 15 Oct 90

[Text] Bucharest, ROMPRES 15/10/1990—Prime Minister Petre Roman received on Monday, October 15, Robert Ferchat, president of the Administration Board of the Atomic Energy of Canada Ltd.

They discussed aspects of the Romanian-Canadian collaboration in nuclear energy and inspected possibilities that the Canadian firms speed up the works and the new organization in the building site of the Cernavoda atomic power plant, referring also to the parties' liabilities as regarded the observance of the mutually established terms, as some arrears could be noted in that respect. Analyzed were also questions regarding the instruction in Canada of the technicians for the operation of the station, the assessment of the quality of the fuel, of the heavy water, etc.

The interview was attended by Anton Vatasescu, minister secretary of state for industrial and commercial activity, and Saul Grey, Canada's ambassador in Bucharest.

#### Iliescu Meets Energy Official

AU1510201290 Bucharest ROMPRES in English  
1848 GMT 15 Oct 90

[Text] Bucharest, ROMPRES 15/10/1990—Romania's President Ion Iliescu received on October 15 Robert Ferchat, president of the Administration Board of the Atomic Energy of Canada Ltd.

During the interview, they discussed the stage, quality and prospects of completing the building works of the Cernavoda atomic power station assessed as a model of Romanian-Canadian collaboration in a peak domain of technology. The necessity was also pointed out of speeding up the delayed works, so that the first reactor of the station should supply the national economy with energy the soonest. Concrete aspects of the collaboration between the two parties, including the training of the technicians and the securing of high quality of all equipment for that important project were also discussed.

Saul Grey, Canada's ambassador in Bucharest, attended.

### IAEA To Inspect Cernavoda Nuclear Power Plant

AU0410101790 Bucharest ROMPRES in English  
0920 GMT 4 Oct 90

[Text] Bucharest ROMPRES 4/10/1990—A group of experts of the International Atomic Energy Agency (IAEA) are making a technical expertise to establish the measures to be taken so that deficiencies be removed and

the security of the atomic energy plant at Cernavoda be ensured. Taking into consideration the compromises having been made during last years under the former leadership, the electric power department of the Ministry of Resources and Industry was forced to apply for

that expertise so that works be resumed and made in complete security.

The mission of the experts of the International Atomic Energy Agency will conclude on October 12.

## ARGENTINA

### CNEA Denies Radioactive Contamination Claim

PY0610012090 Buenos Aires BUENOS AIRES  
HERALD in English 5 Oct 90 p 11

[Text] (NA-DYN)—The state-owned oil company YPF stated yesterday that the yellow-green cloud which was seen on Tuesday over La Plata and Ensenada "was caused by a nontoxic industrial process." The incident took place at the La Plata refinery. "This happens when the plant is put to work after being idle for a long time," YPF said. In related news, the National Atomic Energy Commission (CNEA) denied the existence of radioactive contamination of drinking water in the Greater Buenos Aires neighbourhood of Esteban Echeverria. A local family had accused the CNEA of polluting their water but a CNEA document issued yesterday stated that samples of that water were studied and "the presence of radioactive elements was not detected."

### Expert Says Bomb Could Be Built in 2-3 Years

PY0610221890 Buenos Aires NOTICIAS  
ARGENTINAS in Spanish 2014 GMT 6 Oct 90

[Text] Buenos Aires, 6 Oct (NA)—Argentina could build a nuclear bomb in two or three years based on the uranium-enriching infrastructure it currently has.

According to an article published in this week's issue of the weekly EL INFORMADOR PUBLICO, "with additional investments of approximately \$100 million and the appropriate political decisions, Argentina could produce enriched uranium suitable for building nuclear bombs in two or three years."

The article, signed by Norberto Ceresole, an expert in military affairs, states that currently the uranium-enriching plant located in Pilcaniyeu, 70 km from Bariloche, Rio Negro Province, "is capable of producing enough fuel elements to operate a nuclear submarine engine."

"If a political and technical group capable of planning the stages were constituted in Argentina, this country could begin to produce uranium and plutonium for military purposes (nuclear explosions) using the existing facilities and making the necessary investments," the specialist said.

Brazilian President Fernando Collor de Mello recently said that there were secret plans in Brazil to build a nuclear bomb, but that the government has shelved them.

Since the Persian Gulf crisis began, the highest international levels have been analyzing the possibility of a proliferation of nuclear bombs in developing countries.

In Latin America, Argentina and Brazil have the capability to build such a bomb, and Chile could be added to the list, since this country has reinforced its military

power; however, Argentina might sign the Tlatelolco Treaty on nuclear nonproliferation in Latin America, which would prohibit the construction of a bomb.

### Embalse Nuclear Power Plant Resumes Operations

PY1510235590 Buenos Aires LA PRENSA in Spanish  
14 Oct 90 p 5

[Text] Cordoba (TELAM)—The Embalse nuclear power plant resumed operations following a seven-day close-down during which it was inspected and maintenance work was carried out. This information has been released by Rodolfo Haedo, head of the Embalse public relations department.

He explained that the plant was closed down "late on 12 October, as scheduled by the National Power Supply Program [Despacho Nacional de Cargas] (DNC)," to submit the plant to an intensive program that "included inspection and maintenance, both in the conventional and in the nuclear sectors."

He added that a new load of Cobalt 60 was extracted during this period, and that the 648-Mw plant "is performing beautifully by both national and by international standards."

He reported that between 1 January 1990 and 5 October, the plant produced 4,186,973 megawatt-hours of power.

## BRAZIL

### Military Projects Priority in Nuclear Program

PY2509222590 Sao Paulo FOLHA DE SAO PAULO  
in Portuguese 23 Sep 90 p A-8

[Report by Regina Eleuterio and Ricardo Julio]

[Text] Since its inception in the late 1970's, the Parallel Nuclear Program has gained importance within government policy to the point that the National Nuclear Energy Program (Pronen) has suggested that \$2.0 billion (nearly 172 billion cruzeiros in the parallel market) be invested solely in military projects.

Just because President Fernando Collor has decided to fill in a well where nuclear weapons were to have been tested in the Cachimbo Base, Southern Para state, it does not mean that the Parallel Nuclear Program has stopped. The Armed Forces continue their research in secret, free from the international safeguards against producing nuclear bombs. In the report submitted to President Collor de Mello, the Pronen work group (GT-Pronen) recommended that priority be given to the uranium enrichment projects that uses ultracentrifuges (Navy) and laser rays (Air Force).

The Navy project at the Aramar Experimental Center in Ipero, Sao Paulo state is the furthest advanced. The Navy is also beginning a project to construct the first Brazilian nuclear submarine by 1992.

The Army Technological Center (Cetex) in Guaratiba, Rio de Janeiro state, is working on a graphite-moderated nuclear reactor (which generates plutonium). Plutonium, the by-product of the spent nuclear fuel, is the key element for manufacturing the atomic bomb. The Army denies any intention of building the atomic bomb.

The Air Force came even closer to building the atomic bomb. The Advanced Studies Institute (IEAv) in Sao Jose dos Campos, Sao Paulo state, is losing its experts to more attractive salaries elsewhere. Early in the 1980, the laser-ray method was considered the fastest route to enriched uranium. With the exodus of experts and a 40-percent budget cut, the laser-ray enrichment project was shelved.

Military surveillance nevertheless continues to be tight. For the past five years, journalists have not been allowed to enter the IEAv installations, which includes three floors underground and an atomic fallout shelter.

The Persian Gulf conflict and the speculation about Brazilian-Iraqi nuclear cooperation have persuaded President Collor de Mello to postpone a decision on the report submitted by the GT-Pronen. The report suggesting targets for the National Nuclear Energy Program has been in the Strategic Affairs Secretariat for the past two months, awaiting a final approval from the president.

#### Former Navy Chief on Nuclear Program

PY2609123090 Sao Paulo FOLHA DE SAO PAULO  
in Portuguese 24 Sep 90 p A-5

[Interview with Admiral Maximiano da Fonseca, Navy minister from 1979 to 1984, by Regina Eleuterio; place and date not given]

[Text] [Eleuterio] You were Navy minister in 1979 when the Parallel Nuclear Program was implemented. How did that program begin?

[Da Fonseca] We have to go back to 1975 when Frigate Captain Othon Pinheiro da Silva was sent to the United States for a course in nuclear energy. In 1978 he proposed an independent research program to the Naval Engineering Board (DEN), without the participation of Nuclebras [Brazilian Nuclear Corporations, Inc.], to master the nuclear fuel cycle and to then develop a nuclear propulsion system for submarines. The report was approved by Rear Admiral Mario Cesar Flores (then chief of the Navy Staff) and by the Navy minister. In June 1979 he began contacts toward the development of the ultracentrifuge method.

[Eleuterio] But wasn't an agreement reached with the Aeronautics Ministry, which was carrying out research in that area?

[Da Fonseca] There was no agreement, but there was a study. Delio (Delio Jardim de Matos, of the Aeronautics Ministry) and I asked President Figueiredo for a division

of the enrichment project. The Navy was given the ultracentrifuge method, and Aeronautics the laser system.

[Eleuterio] Where did the resources come from?

[Da Fonseca] I approved the release of 5 million cruzeiros in 1979 and 15 million cruzeiros the following year. We were doing everything straight; everything was included in the research item. We only failed to specify the project. The CNEN [National Nuclear Energy Commission] refused to give any financial support, but Rex Nazareth assumed its presidency in 1982, and he facilitated the development of the research. In December 1981, with only seven engineers working on the project—with the support of other scientists—the first ultracentrifuge was built. In 1982 we carried out the first successful enrichment test. Five years later, the president announced that the uranium cycle had been mastered.

[Eleuterio] But why the secrecy? Did it prevent difficulties?

[Da Fonseca] The secrecy in the nuclear program was instituted not to hide it from public opinion but rather because of foreign pressures from countries that wanted Brazil to continue to be dependent on nuclear technology. The talk about an atomic bomb was to prevent access to that technology. Regarding any difficulties, the first was in obtaining resources and the second was foreign opposition.

[Eleuterio] From which countries did the pressure come?

[Da Fonseca] I would rather not mention names. I only want to say how regrettable it is that world powers monopolize research on the atomic, hydrogen, cobalt, and neutron bombs and prevent others from carrying out the same research.

[Eleuterio] Brazil has not signed the nuclear nonproliferation treaty. Doesn't that make getting access to technology difficult?

[Da Fonseca] I think Brazil did the right thing in not signing the treaty. I think it should not sign it. Why should I promise not to do something if others can? If everybody else signs, I will too, but not under the current terms. External pressure had a fantastic result: The ultracentrifuge method has been fully mastered by Brazil. We managed to master the technology despite external pressure.

[Eleuterio] But is that technology enough to produce the bomb...?

[Da Fonseca] The process of making a bomb is no longer a secret but more a matter of just having the necessary ingredients. We can make one, but what for? It is foolish. The purpose is not to manufacture a bomb but rather to master the technology. The Navy's goal is to have a nuclear-propelled submarine. That is not a weapon.



[Eleuterio] What is your personal opinion on manufacturing an atomic bomb?

[Da Fonseca] I would even make one. [sentence as published] I could make a bomb, set it off, and say: I am not going to do anything more because it is foolish. Argentina, the United States, and the CNEN [National Commission for Nuclear Energy] could come and inspect our facilities. I am not going to manufacture the bomb because I do not want to, but why do I need to prove that I can make it? Against whom do I need to use it? This would only bring retaliations against us.

[Eleuterio] Did the external pressure actually help Brazil to master the nuclear technology?

[Da Fonseca] That was our greatest technological achievement. The technology for uranium enrichment is something we have already mastered. It is only a matter of quantities now; the more centrifuges we have the more we can produce. We have the technology to produce more equipment, and all we need now is the money.

[Eleuterio] How many centrifuges does the Navy already have in Aramar?

[Da Fonseca] I cannot tell you, not because it is a military secret but because there are plans to increase the number of centrifuges. It is only a secret because of foreign pressure.

[Eleuterio] You mentioned the money problem. Do you think it will be easier to obtain resources under Collor's administration?

[Da Fonseca] As far as I know, the so-called parallel program will become the official program, and the main nuclear program will become the parallel program. Some \$300 to \$400 million was spent in Resende on the uranium enrichment process through the jet-nozzle [preceding two words in English] system, and nothing is being done. It makes no sense. If we have found a solution that has already been tested and verified and we have the equipment to enrich uranium, why waste time with an experimental project? It has not even been proved whether the jet-nozzle is marketable.

[Eleuterio] In this case, what do you think about the Brazil-FRG agreement?

[Da Fonseca] Brazil could not get access to the technology by buying a nuclear plant; hence the agreement. But the agreement would not have been signed had more attention been paid to the parallel program and had people had more confidence in it. It was probably justified at that time, but it lost its *raison d'être* after we mastered the technology.

[Eleuterio] What do you have to say about the rumors on an agreement with Iraq?

[Da Fonseca] I know nothing about such an agreement. I never knew about it. There is nothing unusual about a team working over there. A sovereign country hired

Brazilian experts who are free to work where they are paid best. The government did not send them there.

### **Collor Explains Deactivation of Bomb Program**

*PY2709011290 Rio de Janeiro Rede Globo Television in Portuguese 2300 GMT 26 Sep 90*

[Text] President Fernando Collor de Mello has told Paulo Henrique Amorim in New York how he deactivated the Brazilian atomic bomb:

[Begin Amorim recording] In a luncheon at the Plaza Hotel, President Collor told me that, as soon as he took office, he ordered deactivation of the program for construction of a Brazilian atomic bomb. The program was known as the Solimoes Program. It consisted of four parts, and each one of them was named after the tributaries of the Solimoes River. One of the parts consisted of nuclear tests that would have been conducted in the hole dug at Cachimbo Hill, in the south of Para State; a few days ago the president ordered that it be filled in.

President Collor is now asking Secretary Jose Goldemberg to draft a new program that will place all nuclear activity in Brazil under the control of a civilian organization. [end recording]

### **Collor To Enhance Powers of Strategy Body**

*PY0210195390 Sao Paulo FOLHA DE SAO PAULO in Portuguese 30 Sep 90 p A-7*

[Report by Gilberto Dimenstein]

[Text] According to an official document obtained by FOLHA DE SAO PAULO, President Fernando Collor has decided to enhance the Secretariat for Strategic Matters [SAE] by granting it more powers than its predecessor, the National Intelligence Service (SNI). These powers are defined in the multiyear plan in which the government establishes its goals. This plan must be submitted to Congress as established by the Constitution.

According to this document, the SAE, which is headed by Pedro Paulo Leone Ramos, must "develop the national nuclear expertise, seeking to strengthen the nuclear sector."

During the administration of Joao Baptista Figueiredo [Brazilian president 1979-85], the SNI conducted clandestine nuclear activities that included war projects with Iraq. These projects were headed by Octavio de Medeiros, who was at that time the SNI chief. President Fernando Collor has reasserted that today the nuclear program is "transparent" and that it is purely for peaceful purposes.

According to this document, the SAE has been entrusted with the following duties in the national nuclear sector: "To implement nuclear programs emphasizing the following areas: 1) To carry out applied research, seeking to achieve national autonomy in the sector; 2) To produce

nuclear devices and heavy equipment for the national industry, particularly for nuclear plants; and 3) To develop technology and issue regulations for the safe operation of nuclear and radioactive installations."

The SAE's role is so vast that it encompasses the activities of the Science and Technology; Environment, Planning; and Regional Affairs secretariats. It also encompasses the activities of the now extinct National Security Council; it is empowered, for example, "to draft medium and long-term strategic programs; it also studies specific strategies that seek to insert Brazil in the First World and to solve domestic problems and regional and social imbalances."

It is empowered to draft the "Brazil 21 Century" program that strives to "eradicate urban and rural poverty" through the implementation of strategies in the technological, industrial, and foreign trade sectors. In the environment sector, the SAE must implement a national "ecological-economic" zoning program.

From the National Security Council, the SAE has absorbed tasks like the Calha Norte project in addition to the other border programs that assist the local municipalities. These programs encompass investments in infrastructure, basic sanitation, health, and education, and supplies for 397 Brazilian municipalities located along the land border area.

This document shows that the SAE will also seek to improve the performance of the SNI.

#### **Higher Nuclear Industry Investment Called For**

*PY0210221090 Rio de Janeiro O GLOBO in Portuguese 30 Sep 90 p 58*

[Text] If the nuclear program is modified according to recommendations made in a report on the subject which was submitted to President Fernando Collor, Brazil will spend \$7.012 billion on it over the next 15 years.

Thus far, \$8.388 billion have already been spent on construction of the nuclear power plants in Itaorna Bay, in the Rio de Janeiro District of Angra dos Reis; on industrial sector research, on the Armed Forces' parallel project, and on other science and technology activities.

In the report submitted to the president, the investment proposed by the Pronem [National Nuclear Energy Program] working group is not aimed at expanding the program. The investment is only sufficient for ongoing projects and their completion as scheduled.

The largest portion of investment will go to the nuclear program's industrial sector, which includes—among other things—power generation, prospecting for radioactive minerals, and engineering activities. By April, approximately \$4.971 billion had already been spent in these areas. If the president implements the working group's recommendations, another \$3.554 billion will be spent by the year 2,000 on five projects, among them the Angra 2 and Angra 3 nuclear power plants.

Of the 13 projects in the industry and services field that have not yet been completed, three are paralyzed and, according to the report, should remain so.

Investment in the science and technology sectors has been much smaller. Thus far, approximately \$411.16 million have been spent in this field. An investment of \$1.939 billion is scheduled for this sector for completion of 21 projects, to include the projects developed by the military, up until the year 2015.

The report stated that if the recommendations are approved, there will be an increase, in absolute terms, of investment in the science and technology sector because activities in this field allow for the operation of industrial facilities.

#### **Report Recommends Investment in Nuclear Sector**

*PY0110224190 Rio de Janeiro O GLOBO in Portuguese 30 Sep 90 p 58*

[Report by Monica Medeiros]

[Text] The secretariat of strategic affairs and the various organs that make up the work group of the National Nuclear Energy Program (Pronem) have issued a secret report, a copy of which has been exclusively obtained by O GLOBO. The report recommends President Fernando Collor to authorize the investment of \$7.012 billion in the nuclear sector before 2015. The report recommends earmarking \$3.554 billion for direct investment and more than \$1.519 to pay costs in the field of industry and services (to complete the construction of nuclear power plants and factories). The report recommends earmarking more than \$1.939 billion to create a "National Reactors Park" and to master the full nuclear fuel cycle.

The work group, which operates under the coordination of Secretary of Strategic Affairs Pedro Paulo Leoni, recommends President Collor to make these investments which would allow the country to develop, by 2015, the nuclear technology necessary for the various nuclear uses. The group also recommends increasing investments in nuclear projects.

The 63-page report and its addenda was written after a little over two months of work by a group of selected civilian and military nuclear scientists. The report has been stored on the president's personal computer and will be used to make a decision that will shape the future of nuclear energy in our country. Despite the clear and objective style used in its four chapters, the report does not provide the president with any information on the quantity of strategic material that will be produced, information that the president might use in making his final decision. The strategic material consists of plutonium and uranium enriched to higher concentrations that can be produced by the (military or civil) reactors that are being built or are being designed. Such reactors are outside international supervision because they have been developed exclusively using Brazilian technology.

The report states that there will be a transition from the current hydroelectric power generation system to a nuclear thermoelectric generation system between 2000 and 2010. The report recommends that nuclear power generation be implemented, preferably using Brazilian-made power plants.

The report has a nationalistic approach. It recommends continuing the research to obtain a higher degree of technological independence. The report stresses that the local effort, which consists of the parallel nuclear program, has produced much more technological progress than the Brazil-FRG cooperation accord.

The report regards the nuclear nonproliferation treaty and other similar treaties as discriminatory and as factors that have hindered the development of the countries of the so-called Third World. For this reason the group recommends that Brazil should not sign that type of treaty.

The work group, which was created through a decree signed by President Collor just 12 days after his inauguration, recommends keeping the nuclear sector outside the government privatization plan. The report emphasizes the importance of all the projects designed by the Armed Forces but stresses that priority attention should be given to the efforts that the Navy and the Air Force have made to enrich uranium using ultracentrifuges and laser technology.

The report recommends that the president should work jointly with Congress, stressing the need to inform society on nuclear matters, provided industrial secrets are protected. The report says:

"Brazilian nuclear activities, which are legitimate from a scientific and technological viewpoint, should also be legitimate from a social and a political viewpoint (...) otherwise, future resistance to nuclear activities could paradoxically restrict the possibilities of improving society's living standards because of the lack of alternative ways of generating power."

The report said that international cooperation, especially with Germany, should be promoted and encouraged despite difficulties over the transfer of technology. "The completion of the nuclear power plants that are being built and the intensification of nuclear cooperation in other projects can help Brazil achieve, at least partially, the originally envisaged objectives," the report states.

#### **CNEN To Administer Nuclear Policy, Programs**

PY2909173890 Sao Paulo O ESTADO DE SAO PAULO in Portuguese 28 Sep 90 p 16

[Text] Brasilia—Under the new restructuring program proposed by President Fernando Collor de Mello, the National Commission for Nuclear Energy (CNEN) will administer both nuclear policy and nuclear programs. This information was announced by Pedro Paulo Leone Ramos, representative of the Strategic Affairs Secretariat

(SAE), in a lecture he gave at the general conference of the International Atomic Energy Authority (IAEA) in Vienna, Austria.

On that occasion, the SAE secretary emphasized that "the CNEN is now directly responsible for all projects in the Brazilian nuclear program." Ramos added that "the administrative changes that have been made are intended to bring the Brazilian nuclear program into full view."

Discussing the intensification of nuclear cooperation with Argentina, Ramos said that "the Brazilian Government wants to participate in international cooperation aimed at promoting the use of nuclear energy for peaceful purposes." He asserted that the Brazilian and Argentine Governments will cooperate in observing the nonproliferation of nuclear weapons.

In the opinion of CNEN President Jose Luis Santana, Brazil should open its nuclear installations to the Argentines so that this reciprocity will prevent the risk of both countries developing nuclear energy for belligerent purposes.

In his Vienna lecture, Ramos said that all Brazilian nuclear installations and activities will come "under the scrutiny of the National Congress, which will establish the priorities in our program."

Military officers working in the nuclear sector have not paid much attention to President Collor's announcement in the United States that Brazil is working on a project to manufacture nuclear weapons known as the Solimoes Project. They were surprised at the announcement and insisted that "Brazil is only developing nuclear technology for peaceful purposes."

CNEN sources said they had no knowledge about such a program but would like to have more information on the Solimoes Project and its development. At the Brazilian Nuclear Energy Association (ABEN)—a civilian organization of nuclear experts in the country—President Collor's announcement even caused indignation on the part of some experts. They now want to know how \$100 million could be invested in a project without the community having any knowledge of it. A nuclear physicist said: "In a sector that lives with outstretched hands, such an amount of resources could not have gone unnoticed."

Former CNEN President Rex Nazareth Alves said yesterday that he did not know about the existence of the Solimoes Project. Physicists working for the CNEN under its new president, Jose Luis Santana, made similar statements. The SAE-dependent CNEN, headquartered in Brasilia, is coordinating all nuclear projects under the parallel program administered by the Armed Forces since the 1970's.



### Report on Environmental Effects of Nuclear Research

PY0410014990 Rio de Janeiro O GLOBO in Portuguese  
30 Sep 90 p 58

[Text] The country today has a stock of 25,000 tons of cake II (torta II) from the extraction of minerals and some 1,000 tons of low and medium-intensity waste in Araguaia and Goiania. There is also waste produced by Aramar and research institutes and the processed fuel from reactors.

In section six of a report submitted by the Strategic Affairs Secretariat [SAE], a group of civilian and military scientists in charge of studying the effects of nuclear activities on the environment recommended the urgent selection of a "single place to serve as a nuclear dump" (italicized in the text). The report also recommended a formal ban on the "definitive dumping of liquids and gases..."

Almost four pages—82 lines—of the 63-page report deal with nuclear technology and the preservation of the environment. The scientists discouraged "the temporary dumping of waste," noting that the lack of accurate information available to the public has been one of the main reasons for the growing rejection of nuclear programs. The SAE report recommends an increase in channels used to convey information to the public on the operation of nuclear centers, the use of energy, actual risks, and safety regulations. On page 50 the report states:

"The following factors have significantly fostered opposition to the development of the nuclear sector: the fact that these activities have been linked to military weapons; the environment of secrecy that has at times unnecessarily surrounded nuclear activities; fear of the effects of radiation; distrust regarding safety conditions in nuclear facilities; doubts about the existence of safe methods for handling and dumping radioactive waste; and the failures of the nuclear program, in addition to its high cost."

The accident in Goiania was not an isolated occurrence. The risk of a new accident, the report states, calls for the creation of a system for the permanent control of nuclear medical equipment and facilities that house radioactive materials.

The section concluded by saying that the government should extend its full support to the efforts that the CNEN [National Commission for Nuclear Energy] has made to urgently remove the drums from Abadia, Goiania.

### Group Wants Nuclear Sector Under Civil Control

PY0310154490 Rio de Janeiro O GLOBO in Portuguese  
30 Sep 90 p 58

[Text] Brasilia—According to a secret report on the nuclear sector that a working group has submitted to

President Fernando Collor, civilians should be actively involved in the sector's development. The group recommends the creation of a management structure under which civilians will supervise and control nuclear activities. Within this structure, the deliberating council will be one of the most important organs because it will accompany and supervise nuclear activities in the country. This recommendation coincides with the proposal of environmentalists who have unsuccessfully tried to control the sector through Congress, as is set forth in the Constitution.

Those who oppose the use of nuclear energy want to know what is happening beyond the walls of nuclear power plants and nuclear institutes. Thus far they have only obtained some information through the courts or through a congressional investigative committee. The Constitution sets forth that Congress will supervise nuclear research activities through a standing committee; however, two years after the promulgation of the new Constitution, nothing has been done in this regard.

The deliberating council will be made up of two chambers: the Chamber of Research and Development and the Chamber of Safeguards, Radioprotection, and Nuclear Safety. Each chamber will have decisionmaking powers within its own area. Both chambers will be presided over by the secretary of strategic affairs, who will also head the council. The president of the Republic will designate the members of both chambers, including the civilian representatives. They will have access to all nuclear facilities in the country.

The Chamber of Research and Development will comprise representatives of the ministries of the Navy, Army, Foreign Affairs, Education, Aeronautics, Infrastructure, Science and Technology; by the president of the National Commission for Nuclear Energy [CNEN]; by a representative of the scientific community; and by a representative of the business sector.

The Chamber of Safeguards, Radioprotection, and Nuclear Safety will comprise representatives of the ministries of Foreign Relations, Health, Labor and Social Security; by representatives of the Armed Forces staff; by the secretaries of the environment and of science and technology; by representatives of the scientific community; and by two civilians.

### Agreement To Launch USSR Satellites Discussed

PY0410221090 Rio de Janeiro O GLOBO in Portuguese  
3 Oct 90 p 26

[Text] Brasilia—The use of the Alcantara space base to launch Soviet satellites—as reported by O GLOBO yesterday—has been under negotiation since the past administration. The issue was first mentioned by an official Aeronautics Ministry mission to the Soviet Union in 1988. That mission included Socrates da Costa Monteiro, who was then serving as aeronautics deputy chief of general staff and is now aeronautics minister



A Soviet mission headed by the commander of the Soviet Air Force also visited Brazil. Last year a delegation from Glavkosmos—the Soviet space agency—visited the space base under construction in Maranhao.

The Soviet's interest in Alcantara is simple: Alcantara is close to the equator, and satellites launched from this site can save as much as 25 percent in fuel costs. In exchange, the Brazilian military wants to obtain the technology for the use of liquid fuel in satellite launching vehicles (VLS).

An agreement with the USSR to use Alcantara could break the international technological blockade on the VLS program. To speed up the transfer of technology, the Brazilian Government has been encouraging the creation of a joint venture between Glavkosmos and the Brazilian firm Elebra [Brazilian Electronics, Inc.].

#### **Group Recommends Completion of Nuclear Projects**

PY0510013590 Rio de Janeiro O GLOBO in Portuguese  
30 Sep 90 p 58

[All figures as published]

[Text] Brasilia—Of the three nuclear power plants that Brazil plans to build—one of them was purchased from the U.S. Westinghouse company and the construction of the other two was arranged through cooperation with the FRG—only one is complete, the U.S.-made Angra-1. The other two, which should have begun operations in 1984, will be ready to operate between the years 1996 and 2000.

Despite the problems that Angra-1 has experienced since it began operations, a working group that submitted a report on the subject to President Fernando Collor considered the plant's output to be satisfactory and the completion of the Angra-2 plant to be a priority task. The group recommended that the third plant be finished between 1996 and 2000.

The group's report states that the Angra-2 plant should have begun operations in 1982 but financial, managerial, and institutional difficulties have delayed the project.

Up to April 1990, \$1.612 million had been spent on Angra-2. It is expected that the project will require additional direct investments of \$1.594 million. The total price of the project, including financial costs, is expected to reach \$5.650 million.

Despite the fact that 73 percent of the cost for civil works and the same percentage of the cost for the project had already been paid by January 1990, the working group's report states that the plant's electromechanical assembly is still a critical phase in the project.

For the Angra-2 project, 48 percent of the Brazilian-made equipment and 87 percent of the imported equipment has already been delivered. The current timetable calls for the plant to begin operations in 1996.

Work on Angra-3 is paralyzed. The construction of the plant should have been completed in 1984, but the work has not gone beyond the excavation of the basement despite the fact that 51 percent of engineering plan has already been completed.

As for equipment, 81 percent of the imported equipment and only five percent of the Brazilian-made has been delivered.

According to Furnas [Furnas Electric Power Plants, Inc.], \$1.283 million had already been spent on Angra-3 up to 1989. It is expected to cost an additional \$2.282 million to complete the project. According to the report, the Angra-3 plant has experienced the same difficulties as Angra-2; this is the reason behind the almost 20-year delay.

#### **Officials View Launch Site-for-Technology Trade**

PY0510214090 Rio de Janeiro O GLOBO in Portuguese  
2 Oct 90 p 25

[Report by Claudia Maciel]

[Text] Moscow—Lieutenant Brigadier Socrates Monteiro, Brazilian aeronautics minister, who is now on an official visit to the Soviet Union, has made a proposal to Aleksandr Dunayev, director of the Soviet space agency Glavkosmos, to use Brazil's space bases (the Alcantara base in Maranhao State and the Barreira do Inferno base in Rio Grande do Norte) for Soviet launches. Socrates Monteiro is also trying to arrange with the Soviets the transfer of liquid fuel technology to be used in Brazilian rockets.

The director of Glavkosmos said: "Our experts who visited the Brazilian bases were impressed. The locations are excellent and the infrastructures perfect. We can invest and participate in the improvement of those bases for future joint launches."

Socrates Monteiro explained that the bases are the property of the Brazilian Air Force, which is interested in their commercial utilization.

He said: "Our space programs require large amounts of resources, and we have to find a way to generate those resources. The Brazilian Armed Forces also want to participate in research activities aimed at putting their own vehicles in space."

To that end, Minister Monteiro reported that a program to launch a 200-kg vehicle into a low orbit is in its final stage. The vehicle, which is assembled in three sections, will operate on solid fuel. Socrates Monteiro affirmed that Brazil has not yet been allowed access to liquid fuel engine technology because of what he called a "blockade" by developed countries.

Since the Aeronautics Ministry projects are intended exclusively for peaceful purposes, Socrates Monteiro

believes that there is a possibility of the Soviet Union contributing through the transfer of liquid fuel technology.

The minister emphasized to the Glavkosmos director the need to immediately exchange experts between the two countries to speed up the implementation of the agreement on scientific and technological cooperation that was signed between the USSR and Brazil.

### Nuclear Development Recommendations Made

PY0510151490 Rio de Janeiro O GLOBU in Portuguese 30 Sep 90 p 59

[Report by Paulo Motta]

[Text] A report on the Brazilian nuclear program's scientific and technological sectors submitted by a working group to President Fernando Collor recommends the development or the conclusion, by the year 2015, of seven nuclear reactors, all of them outside international safeguards, for study or commercial purposes; seven projects aimed at mastery of the nuclear fuel cycle at the laboratory and industrial level; a thermoelectric radioisotope generator; and an electron accelerator. The report also recommends programs for storing and processing radioactive waste, for developing zirconium and hafnium technology, and for producing heavy water and radioisotopes.

This chapter of the document, which runs from page 24 to page 42, recommends making new investments in the sector, before the year 2000, of approximately \$1.93 billion. Thus far, \$411 million has been spent on those projects, the total cost of which will amount to \$2.35 billion, excluding private sector investment and possible changes in the programs.

According to the report, the path Brazil should naturally follow to master nuclear reactor technology is the same path followed by countries that have developed the technology for large power plants. This path involves the development of small units to gain experience—at a low cost—in the fields of design, construction, and evaluation.

The group of water-cooled pressurized reactors includes the 11-megawatt National Water-Cooled Pressurized Reactor (Renap-11) in Aramar (Sao Paulo), which the Navy is developing and which is in an advanced stage of development. All major parts for the Renap-11 are being built in Brazil. Construction of this reactor—for which \$195 million has already been spent, with expenses of \$395 million still pending—is scheduled to be completed in 1995. A Navy and CNEN [National Commission for Nuclear Energy] project, which stems from the Renap-11, is the 100-megawatt National Water-Cooled Pressurized Reactor (Renap-100). This reactor, which is in the design phase, will have internal protection systems and will be used in mini-nuclear power plants. According to the report, five Renap-100 units can together produce up to 500 megawatts. Individual Renap-100's can be used in

strategic systems in remote areas. This reactor is scheduled to begin operating in the year 2000. Development of the Renap-100 will cost \$100 million, while construction will cost \$300 million.

As for gas-cooled reactors, the Army Technological Center (Cetex), located in Rio de Janeiro, has been developing them since 1982. Cetex has a subcritical unit and is trying to build an Experimental Irradiation Reactor (REI) because the center has already mastered nuclear-grade graphite technology. The project's objective is development of a High Temperature Gas-Graphite Modular Reactor. The REI will be ready in 1994. Thus far, \$49 million has been spent on the REI, with \$72 million in expenditures still pending. The place where it will be located has not yet been established. The report recommends that the REI have no more than five megawatts of thermal power. This is an indication that it will not be used for the production of plutonium (the material for bombs).

Special reactors are those that are needed for the complete mastery of nuclear technology. They are the reactor for material testing (Retema), the space reactor, the high flux reactor for physics research, and the regenerative reactor. The Navy and CNEN are designing the Retema for construction in Aramar. It is a high neutron flux reactor for testing materials. This reactor can be used to process fuel for other reactors. The report states that this reactor is necessary to support the development of naval nuclear propulsion. The reactor, which is scheduled to begin operating in 1997, will cost \$268 million.

Space reactors are part of a project that the Air Force Aerospace Technology Center's (CTA) Institute of Advanced Studies began in 1987, with a view toward using reactors in Brazilian satellites. Construction and testing of a model for generating 100 kilowatts is scheduled for 1995. A thermoelectric source will be used to simulate the reactor. This phase will cost \$1 million. Construction of a small reactor has been scheduled for the year 2000. The working group recommended construction of a high flux reactor for physics research, noting that the Center for Nuclear Technology Development and the Federal University of Minas Gerais can build it. The reactor will be used to perform studies in the areas of nuclear and solid state physics. It will cost approximately \$230 million.

The regenerative reactor, which is still being developed around the world, would allow Brazilian fission reactors to operate for many more years because they operate with mixed uranium and plutonium oxides. Despite the fact that there are still doubts about its commercial feasibility, the report states that it would be advantageous for the country to continue with the corresponding research. Efforts should concentrate on developing the sodium-cooling system with a view toward building a uranium-plutonium or uranium thorium-fueled experimental 20-megawatt fast reactor at the beginning of the 21st century's second decade.

Other projects are: A linear electron accelerator, which was begun in 1985 and is destined to set the parameters for nuclear activities in the country. It is scheduled to begin operating in 1994 and will require an investment of more than \$5.8 million. Another project is a thermal radioisotope generator, which is a CTA project that can be used for future Brazilian space probes or for generating power for navigation buoys and air traffic control radars in barren regions. The objective of this project is to build a 15-watt prototype by 1993. In the prototype, an electric power source will replace the nuclear source. The cost will be \$1 million. The second phase provides for construction of a similar prototype in 1996 with a nuclear source purchased abroad. The cost will be \$1.2 million. The third phase, according to the report, will depend on whether Brazil decides to build a plutonium reprocessing plant because plutonium is the fuel for the generator. The report recommends construction of a unit that will generate several hundred watts.

#### **Report Recommends Uranium Enrichment Methods**

*PY0510230390 Rio de Janeiro O GLOBO in Portuguese 30 Sep 90 p 59*

[Text] In the chapter dealing with scientific and technological development, a report submitted by the working group of the Pronen [National Nuclear Energy Program] recommends increasing the efforts to master the fuel cycle technology. The need to master the fuel cycle stems from the need to feed Brazilian reactors, both now and in the future, and the need to overcome the strategic restrictions imposed by the international market. The report says that these restrictions have led to the implementation of the Brazilian autonomous program.

One of the projects recommended by the report is the purification and conversion of uranium hexafluoride, a process whose technology was mastered at the laboratory level by the Institute for Nuclear and Energy Research (Ipen) in 1979. Uranium hexafluoride is a gas through which it is possible to separate isotopes for enrichment.

A pilot plant for the production of this radioactive gas began to operate in 1983. Its annual output is 23 tons of gas, which is essential for the enrichment process. In 1988, the Navy Ministry began the construction of an industrial pilot plant in Aramar. The reports says that the plant, whose output of gas will be 300 tons per year, will begin operating in 1995 and will cost \$200 million.

Concerning uranium enrichment, the Pronen working group says that priority should be given to projects that use ultracentrifugation (Aramar) and the laser process (CTA) [Aerospace Technology Center], leaving the jet nozzle process, which is used in the project with the FRG. The report questions the economic feasibility of this process.

The report adds that construction of an additional module of the Almirante Alvaro Alberto Isotope Enrichment Pilot Plant will be completed in Aramar this year.

This will make it possible to supply 20-percent enriched uranium to the IEA-R1 reactor of Ipen. The IEA-R1 is the only Brazilian reactor that is producing radioisotopes. It has been difficult to obtain fuel for this reactor on the international market because the countries of the so-called Atomic Club have restricted the sale of nuclear material to Brazil.

The report states that the capacity of the ultracentrifugation plant at Aramar is 1.8 UTS [separative work units] per year per machine, and that a new generation of 3 UTS/year machines has already been developed. The report adds that a 10 UTS/year model is being developed and that a 25 UTS/year model is at the design stage. The objective is to build a 100,000 UTS/year industrial pilot plant by 1996. The plant's total cost will be \$330 million.

The laser enrichment process, which the CTA began to study in 1972, has been divided into two projects: One dealing with the atomic separation process, which is considered potentially more efficient, and the other handling the molecular separation process.

The report says that both processes are at the laboratory stage. A pre-pilot plant [usina pre-piloto] that is able to evaporate four kg of metallic uranium is being designed and should be ready in 1993. The working group estimates that the plant will cost \$15.7 million and that operational expenses will be \$1.2 million.

Production of ceramic pellets: There is a project for building a 36 ton per year pilot plant in Aramar. The plant is scheduled to begin operations in 1994. The production of fuel for Renap-11 and for Retema will cost, according to the report, \$43.5 million.

The reprocessing of spent nuclear fuel to obtain plutonium is considered necessary for definitively solving the problem of waste and for extending the useful life of Brazilian reactors.

The report stresses that at the current stage it is not necessary to master the reprocessing of spent fuel; however, it recommends continuing with the laboratory work at IPEN; programming the construction of a \$200-million pilot plant in the year 2005; and considering the possibility of building the plant near the radioactive waste dump.

#### **Paper Evaluates Key Officials in Nuclear Program**

*PY0610174690 Rio de Janeiro O GLOBO in Portuguese 30 Sep 90 p 59*

[Text] The gallery of figures linked with Brazil's nuclear development undoubtedly begins with Admiral Alvaro Alberto. It is certainly not by chance that both the Angra dos Reis nuclear power plant and the Aramar uranium enrichment plant were christened after him. The admiral was the first Brazilian to develop nuclear projects in the period following World War II. He was even charged with smuggling the first centrifugation machines into our country. Colonel Teofilo Portela Chagas, who did



research on heavy water at the Military Engineering Institute (IME) in the 1960's, was another pioneer.

Brigadier Hugo Piva, who is now involved in secret projects for the transfer of military technology to Iraq, also played a historical role, despite the fact that his nuclear activities are more recent. Piva, who studied at the Aeronautical Technology Institute (ITA), was one of those responsible for development of the weapons production area and for the use of nuclear energy at the Aeronautical Technical Center (CTA). He was known as the "missile man" because he always advocated an autonomous space program, like the one he implemented at the CTA when he was director of that institution. Piva knows every detail of the Parallel Nuclear Program.

Rex Nazareth Alves holds an outstanding position in the gallery of more recent "nuclear figures." He headed the National Commission for Nuclear Energy (CNEN) during the Figueiredo and Sarney administrations. He was one of the few leaders of the old republic to pass unhurt to the new Republic. Nazareth was the guide for the Parallel Nuclear Program and a staunch defender of Brazilian technological development. He operated secret parallel bank accounts to fund the projects. He undoubtedly has a natural inclination toward secret operations. In the Collor administration he was replaced by Luis de Santana Carvalho.

There are several figures in the nuclear military area. Rear Admiral Othon Luiz Pinheiro da Silva, who is president of the coordinating board of special Navy projects, is a staunch defender of Brazilian technological independence. He is one of the stars who played a decisive role in development of the so-called Autonomous Nuclear Program, which was initiated in 1979 by a group of military men who were dissatisfied with the results of the Brazil-FRG nuclear accord, which was signed four years earlier. In 1975, the year when President Ernesto Geisel agreed with the FRG on the purchase of a gigantic black box of nuclear technology, then Frigate Captain Othon Luiz Pinheiro da Silva was sent to the United States to take a postgraduate nuclear energy course at the Massachusetts Institute of Technology (MIT), which is one of the world's leading research and technological development centers.

His first decision was to recommend that the Directorate of Naval Engineering, in Rio de Janeiro, develop nuclear research without the participation of Nuclebras [Brazilian Nuclear Corporations, Inc.], which was managing implementation of the Brazil-FRG accord. He proposed a totally different method for producing nuclear fuel—the ultracentrifugation method. The green light to begin a parallel nuclear program came less than one year later from Rear Admiral Mario Cesar Flores (at that time he was Navy chief of staff) and from Navy Minister Maximiano da Fonseca.

Air Force Colonel Reginaldo dos Santos is current leader of the Air Force nuclear projects. He has headed the

Institute of Advanced Studies since its creation. A Ph.D. from Purdue University, Indiana (United States), where he majored in high energy lasers, Dos Santos joined researcher Sergio Porto's group at Campinas University in 1978. Porto coordinated the CTA project for uranium enrichment through lasers. Dos Santos is considered the main disciple of Colonel Jose Albano do Amarante, who until his death in October 1981 tried to continue with Porto's research.

In the Army, in addition to Colonel Chagas, a pioneer, and to General Venturini, who headed the currently defunct National Security Council at that time, the new generation of nuclear figures includes Army Secretary of Science and Technology General Romero Lepesqueur and General Nelson Querido, director of the Special Projects Institute (IPE) of the Army Technological Center.

Today, however, the most important man for the Brazilian nuclear future—obviously, in addition to President Fernando Collor—is Secretary for Strategic Affairs Paulo Leone, who coordinated the working group that formulated the proposals for the new nuclear program. Leone, however, is also fond of secrecy.

#### **Minister on Nuclear Program, Alleged Test Site**

*PY0510224290 Rio de Janeiro O GLOBO in Portuguese  
3 Oct 90 p 26*

[Report by Jose Eustaquio de Freitas]

[Text] Sao Jose dos Campos—At a conference for trainees from the Association of War College Graduates, ADESG, Navy Minister Admiral Mario Cezar Flores said that President Fernando Collor had decided to deactivate the existing holes at testing grounds in Cachimbo, south of Para, after meeting with the military ministers. The conference and debates that took place at the Aerospace Technology Center (CTA) were confidential.

The minister said he was not familiar with the Solimoes Project—a project to develop an atomic bomb, as revealed by Collor—or the holes dug in Serra do Cachimbo, allegedly for nuclear tests. According to the Navy minister, the Aeronautics Ministry never admitted that the holes were to be used for atomic explosions. Admiral Mario Cezar Flores noted that none of the military ministers, not even the Armed Forces chief of staff, knew the purpose of the holes in Cachimbo.

The Navy minister said the slow flow of funds for research on the nuclear program and the need to further discuss the program and to obtain political support for its continuation are factors that will contribute to further setting back the Navy Ministry's deadline for its atomic submarine project. This means that the first tests of the 11-megawatt experimental reactor—which were originally scheduled for 1995—will be delayed, postponing the construction of the submarine until the end of the century.

The minister was surprised to be asked about the president's intention to reduce the military presence in the nuclear field.

"That is an stunning question, and it should be addressed to the president; I never thought about it like that and I never worried about it. I do not know why this is being discussed, and the question surprises me," the minister said.

During the debate with the ADESG trainees, the Navy minister revealed that his ministry will spend \$365 million to develop nuclear technologies, \$168 million of which will be used on the fuel cycle. The remaining funds will be used to develop a reactor. He said that the Brazilian nuclear program must be approved by Congress and the public as well.

"I hope society will decide in favor of nuclear propulsion and understand that this is a Brazilian program that is not connected with atomic bombs, as has unfortunately been suggested by some sectors," the minister stated.

#### Details of Electric Motor for Nuclear Submarine

PY0910142090 Sao Paulo O ESTADO DE SAO PAULO in Portuguese 3 Oct 90 p 18

[Report by Wagner Barreira]

[Text] The University of Sao Paulo's Polytechnic School yesterday unveiled an electric motor for the nuclear submarine that the Navy plans to build in the next decade. A group of 15 engineers are working on the project, which has already developed a 100 hp [horsepower] prototype (less power than a trolleybus motor). While this prototype is being built by the Villares Company, the group is working on a 1,000 hp motor (the power of a subway car) that should be in operation in three years. A 10,000 hp motor for Navy ships should be ready in 10 years.

A motor for a nuclear-powered ship, with similar characteristics and specifications, cannot be found on the market. Rear Admiral Othon Luiz Pinheiro, president of the Navy's Technological Development Agency (Copesp), believes: "Everybody in the world will use this motor in time." He emphasizes: "This is technology that is here to stay." The cost of the prototype was \$600,000, and the whole project is estimated to cost \$3 million, which will be divided between Copesp and Finep (Funding Authority for Studies and Projects). The motor's development involved various fields of knowledge and was coordinated by Professor Orlando Silvio Lobosco. The motor uses rare earth magnets (samarium and cobalt alloy) to generate a magnetic field. The rare earths were mined by Nuclemon [Nuclebras Monazite and Associated Elements, Ltd.] and processed at the Copesp laboratories. Magnets of this type are used in smaller motors developed by the Siemens company. The German industry uses a 1,500 hp motor of this type for ship propulsion. Professor Lobosco affirms: "We have developed a motor that is twice as powerful as conventional

motors, occupying a relatively small space." The project also foresees a piece of equipment with high reliability, easy maintenance, and independent control of torque and speed.

Professor Lobosco says: "The electronic commands permit adjustments that eliminate a waste of energy and provide better drivability." The motor also has another advantage that is useful for military purposes—it is quiet and almost sonar-proof.

Clovis Goldemberg, one of the engineers participating in the project and son of Jose Goldemberg, national secretary of science and technology, says: "The project we are developing will not qualify for a Nobel Prize, but few scientists in the world are tackling the challenge of building a motor of that power with permanent magnets." He adds: "This motor is the result of a combination of the latest technologies." In the opinion of Rear Admiral Othon Luiz Pinheiro, the new motor, bearing the long name of "motor with permanent magnets and electronic commutation," is the result of a new outlook in the development of national technology. He says: "We have had enough of importing black boxes," adding "with this project, we demonstrate that we can learn by doing."

The project has been developed for the Navy, but Finep will transfer it to national industry, collecting royalties. The motor can be used in machinery, industrial equipment, robots (Japan is already doing that), steelmaking plants, cellulose and papermaking plants, and transportation. The French high-speed train uses a motor of the same type. The technology of rare earth magnets also has an assured market in the manufacture of loudspeakers. "In addition, we are going to transfer to Polytechnic School students a whole spectrum of knowledge not directly related to this project," Professor Lobosco affirms.

#### Reportage on Closing of Cachimbo Borehole

##### Collor's Motives Examined

90WP0174A Sao Paulo O ESTADO DE SAO PAULO in Portuguese 20 Sep 90 p 20

[Article by Rubens Santos: "Collor Buries Construction of the Bomb"—first paragraph is editor's foreword]

[Text] President Collor's symbolic gesture—his dumping of two shovelfuls of lime into the boreholes dug in the Serra do Cachimbo, in Para State—does not put an end to the so-called parallel program of nuclear development that involves military personnel of the three branches of the armed forces, the Institute for Nuclear and Energy Research (IPEN), and entities coordinated by the National Commission for Nuclear Energy (CNEN). Sources involved in the program insist that these projects will be continued.

The president's gesture, however, sends a clear and objective message: Brazil should not, under any circumstances, develop technology for use in the construction of nuclear weapons. Moreover, these same sources say, President Collor also wanted to reduce the external pressures at a moment when Brazil is renegotiating its foreign debt and he himself is preparing for a trip to New York, where he will deliver a speech at UN headquarters.

"It was a political response," one source insisted. "The programs are continuing, but within the framework of the constitutional precept that limits the use of nuclear energy and its technology solely to peaceful purposes." The only restrictions on the continuation of the projects are of a budgetary nature.

The Navy, for example—which in the Ipero [Navy's Aramar Experimental Center at Ipero, Sao Paulo] is developing a process for the enrichment of uranium in conjunction with the IPEN—has already spent a total of \$347 million over the past 10 years. It will need an additional \$90 million this year, but will have difficulty getting more than \$30 million to invest in research. In contrast to the agreement signed with Germany in 1975, however, the results already achieved by the parallel program are being viewed as promising even by the international community.

The Navy will probably not escape at last one other controversy this year with respect to the military objectives of its program, which has already been put on hold by President Collor in accordance with evaluations by specialists in this sector. In the past two weeks, during the reexamination in Vienna of the Nuclear Weapons Nonproliferation Treaty, the development of nuclear submarines was viewed as defiance of the guarantees of nonproliferation, inasmuch as the materials utilized would be outside the control of the safeguards.

This decision is believed responsible for the fact that Canada has discontinued its submarine construction program. What is in doubt now is how it will be interpreted at the Aramar Experimental Center, where the Navy is developing the technology for the propulsion reactors of the Brazilian nuclear submarine. As for the plutonium that the Army is reportedly obtaining by means of a graphite-controlled reactor, experts who were interviewed yesterday consider the results to be insignificant. Twenty years would be needed for the Army to amass the four kilograms of uranium it would need to make an atomic bomb, according to a source connected with AGENCIA INTERNACIONAL.

Experts in the nuclear field say that the boreholes are of no use whatever to the Brazilian program. Measuring 1.2 meters in diameter and 320 meters in depth, they could be used for nuclear detonation tests, but because Brazil does not have the technology to accomplish this, the experts are wondering what other uses the boreholes might have and why they were drilled.

### Legal Action Against Ministers

90WP0174B Sao Paulo O ESTADO DE SAO PAULO  
in Portuguese 20 Sep 90 p 20

[Unattributed article: "Deputy Wants To Take Legal Action Against Ministers Responsible"]

[Text] Brasilia—Minister of Aeronautics Socrates da Costa Monteiro and the Chief of the Armed Forces General Staff, Jonas de Moraes Correa Neto, may be tried for the "crime of responsibility" because they allegedly gave false testimony to the chair of the Chamber of Deputies concerning the Serra do Cachimbo Proving Ground. Deputy Fabio Feldmann (PSDB [Brazilian Social Democracy Party], Sao Paulo) yesterday transmitted a formal letter requesting that the two military officers be disciplined.

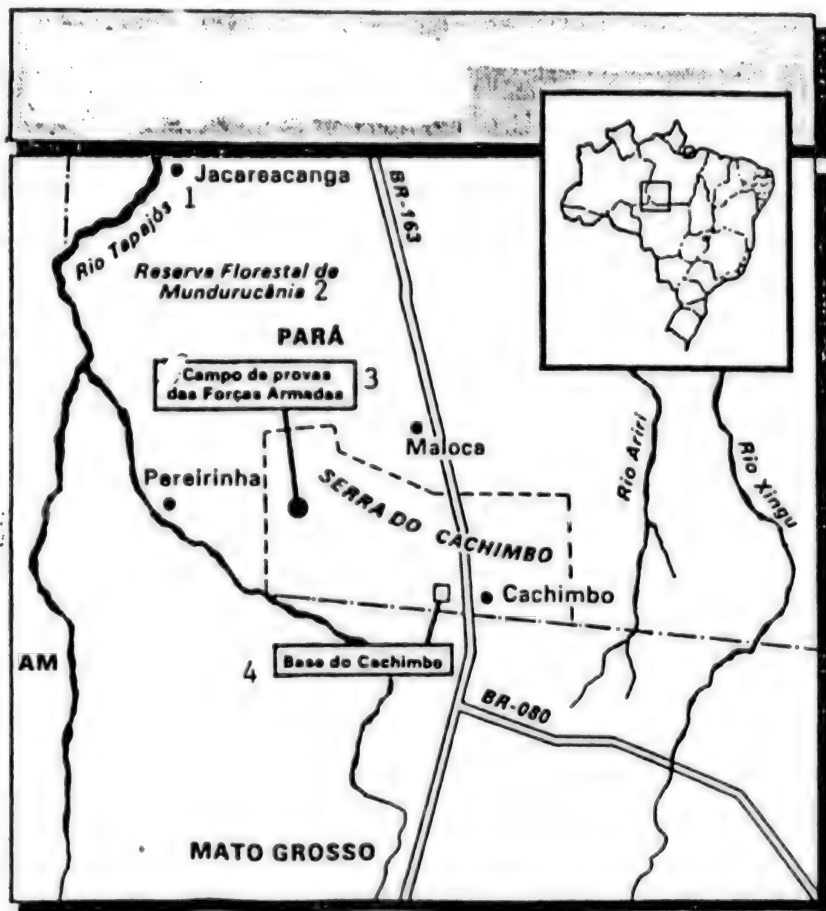
Feldmann regards the closing of the borehole by President Collor as confirmation of the existence of underground installations that could be used for nuclear tests. The two ministers refuted this hypothesis in their response to written requests for information that the deputy made in April. Costa Monteiro said there were no underground installations under his jurisdiction. Correa Neto denied any knowledge of the installations other than the systematic denials made by those organs having jurisdiction.

Not satisfied with these responses, the deputy last week made a new request for information and—seemingly by coincidence—President Collor directed the military ministers to conduct an investigation to determine whether there were areas in Brazil intended for use in nuclear tests. Claudio Humberto Rosa e Silva, spokesman for the office of the president of the Republic, stated that the report submitted in response by the military ministers confirmed the existence of a borehole in the Serra do Cachimbo—under the jurisdiction of the minister of Aeronautics—that could be used for such tests. "The Congress has been treated with disrespect," Feldmann complained.

According to Rosa e Silva, the borehole in the Serra do Cachimbo, measuring 320 meters in depth and 1.2 meters in diameter, was drilled at a cost of approximately \$1 million with authorization from the National Security Council (which was abolished by the Constitution of 1988), under the direction of an official of the Aeronautics Ministry but without the ministry's knowledge.

The committee created by the Brazilian Physics Association (SBF) to monitor nuclear matters has also construed President Collor's symbolic gesture of dumping a shovel of lime into the borehole as confirmation that the now "buried" program was at one time alive. The physicist Luiz Pinguelli Rosa of the SBF said that he met Friday with Rear Admiral Othon Luiz Pinheiro, one of the coordinators of the Navy's nuclear program, and

Where the Serra do Cachimbo Proving Ground Is Located



Key:

1. Tapajós River
2. Mundurucania Forest Reserve
3. Armed Forces Proving Ground
4. Cachimbo Base

according to Rosa it was only after very persistent questioning that Pinheiro admitted that "the drilling at the base was in fact not compatible with a peaceful nuclear program." The SBF will now ask President Collor to ban the construction of reactors by the Armed Forces, because these reactors will produce plutonium—an element used in the production of atomic bombs.

The closing of the borehole, however, will not interfere with the activities of the Serra do Cachimbo Proving Ground. According to Brigadier General Ivan Frota, tests of incendiary bombs and other conventional weapons will continue to be carried out in the area. He explained that between 1969 and 1988 a total of 13 weapons-test programs were conducted, at an average unit cost of 75,000 BTN [National Treasury Bonds]—44 million cruzeiros in current monetary terms.

**Brazil, Argentina Reaffirm Nonproliferation Goal**

90WP0176A Sao Paulo GAZETA MERCANTIL  
in Portuguese 13 Sep 90 p 6

[“Text” of Joint Declaration—first four paragraphs are columnist Maria Helene Tachinardi introduction]

[Text] Brasilia—The Governments of Brazil and Argentina reaffirmed yesterday in Geneva “their firm commitment to the utilization of nuclear energy exclusively for peaceful purposes and to the goal of the nonproliferation of nuclear weapons in all of their forms and modalities.”

The message is part of the joint declaration distributed at the Fourth Conference for the Evaluation of the Nuclear Weapons Nonproliferation Treaty (NPT), which is being held in Switzerland. The declaration is also a definite indication that the two countries are coordinating their



positions in some international forums with the aim of forming a common market in the latter part of 1994.

Brazil and Argentina have not signed the NPT because they consider it discriminatory. In the joint declaration they say that both "respect the position of those countries that have exercised their sovereign right to subscribe to international instruments which—in the opinion of these states—would serve to promote those objectives (the avoidance of the proliferation of nuclear weapons)" but they "trust that their own choice of means and methods to contribute to the attainment of the same goal will likewise be respected."

The two countries—which are cooperating in various areas (nuclear safety, fuel for research reactors, proposal for a rapid regeneration reactor)—want to make it clear that they do not represent a threat to peace, inasmuch as they have exchanged mutual guarantees and are currently considering full implementation of the Treaty of Tlatelolco for nuclear nonproliferation on the American continent.

#### Text of Joint Declaration

1. Argentina and Brazil reaffirm their firm commitment to the utilization of nuclear energy exclusively for peaceful purposes and to the goal of the nonproliferation of nuclear weapons in all of their forms and modalities. This commitment has been expressly recorded in the statements of the highest authorities of the two countries and in the current policies and actions of both governments, in strict observance of the applicable national and international legal instruments.

2. Brazil and Argentina view with satisfaction the positive trends that have characterized the evolution of relations between the two principal states that possess nuclear weapons and their respective allies. These developments make it possible to envision the adoption of measures conducive to the deceleration of the nuclear arms race and to nuclear disarmament.

3. At the same time, Argentina and Brazil wish to emphasize the fundamental importance of the political will to promote dialogue and understanding among all the members of the international community, with a view to easing tensions and achieving a peaceful resolution of conflicts. In this regard Brazil and Argentina can take legitimate pride in the spirit of cooperation that has prevailed for many decades among the countries of South America.

4. Particularly worthy of mention is the fact that for a number of years Argentina and Brazil have been actively engaged in a process of political conciliation and economic integration, an example of which—among other initiatives—is the coordination of their nuclear policies. To date a total of six meetings of the Working Group and the Permanent Bilateral Committee on Nuclear Cooperation have been held alternately in each country to coordinate policies and exchange information concerning their respective programs in the nuclear sector.

One important aspect of these meetings is the reciprocal visits of high officials and technical experts to the nuclear installations, research centers, and other establishments.

5. The current cooperation between the two countries covers, among other things, the following areas: nuclear safety, mutual aid in the event of nuclear accidents or radiological emergencies, fuel for research reactors, concepts and methods of protection, a project for a rapid regeneration reactor, the exchange of information on materials and techniques, and industrial cooperation.

6. This increasing cooperation is also being reflected in the activity of the delegations of Brazil and Argentina in multilateral and regional forums, as demonstrated by the coordinated initiatives of the two countries at the Disarmament Conference, in the IAEA [International Atomic Energy Agency], and in the OPANAL [Organization To Ban Nuclear Weapons in Latin America].

7. Argentina and Brazil reaffirm their firm commitment to the principles established by the international community in Resolution 2028 (XX) of the AGNU [expansion not given], which established the basic outlines of a multilateral treaty to prevent the proliferation of nuclear weapons. Brazil and Argentina are likewise observing the letter and the spirit of the treaty of Tlatelolco, the full implementation of which is currently the object of an active and intensive exchange of points of view among the interested parties.

8. Argentina and Brazil are firmly convinced of the importance of their individual and joint contributions—both in the past and in the present—to the achievement of the goal of preventing the proliferation of nuclear weapons of every dimension. In the opinion of both countries, the increasing cooperation with respect to the peaceful uses of nuclear energy, and the mutual guarantees resulting therefrom, are the most effective way to attain that goal.

9. Brazil and Argentina respect the position of those countries that have exercised their sovereign right to subscribe to international instruments which—in the opinion of these states—would serve to promote those objectives. Argentina and Brazil trust that their own choice of means and methods to contribute to the achievement of the same goal will likewise be respected.

#### Goldemberg Comments on Cachimbo Borehole Closing

90WP0176B *Sao Paulo GAZETA MERCANTIL*  
in Portuguese 13 Sep 90 p 16

[Article by Cleide Castro: "Collor Orders Closing of Borehole in Serra do Cachimbo"]

[Text] Brasilia—President Fernando Collor de Mello yesterday visited the air base at Serra do Cachimbo in the southern part of the state of Para to personally initiate the work of filling a borehole that could be used



for nuclear tests. A party of 12 accompanied Collor on his visit—which lasted more than two hours—including the three military members of the cabinet (Army, Navy, and Aeronautics) and the chief of the Armed Forces General Staff (EMFA).

The president placed two shovelfuls of lime in the well, which measures 1.2 meters in diameter and 320 meters in depth. According to Jose Goldemberg, secretary for science and technology, who was a member of the presidential party, the government hopes by this action to end the speculations that nuclear tests might be conducted in Brazil with a view to the construction of a Brazilian atomic bomb. "The president has put an end to these speculations in the most unambiguous way possible," he declared, while acknowledging that the president's decision was motivated—among other things—by domestic and foreign pressures.

By way of explanation, the secretary pointed out that although the government has made no formal statement on the matter, it is common knowledge that the U.S. press has repeatedly discussed Brazilian nuclear policy. Goldemberg reaffirmed the government's intention to comply with the Constitution with respect to the development of nuclear activities solely for peaceful purposes.

This clarification also coincides with the president's preparations for his address next Monday [17 Sep] at the opening of the UN General Assembly. The same constitutional principle was also cited by Flavio Rodrigues Duarte, head of the Department of Intelligence of the Secretariat for Strategic Affairs (SAE) of the Presidency of the Republic, in comments he made on the occasion of the president's arrival at the Cachimbo base.

Duarte categorized the borehole as "an isolated engineering project" and explained that it was canceled because it was not in keeping with the "legitimate aspirations" of the president of the Republic and the Brazilian people. He also emphasized that the president had ordered all governmental organs—and the SAE in particular—to "clarify for the Brazilian people and the international community the various aspects of the administration of the nuclear energy program." Hence the necessity, he added, for "putting an end, once and for all, to these controversies and uncertainties."

Following the example of the SAE official, Goldemberg insisted that the borehole—which is scheduled to be completely plugged within a month—was never used, precisely because "Brazil does not have the raw material (uranium enriched to 94 percent) required to carry out nuclear tests."

Additional proof, the secretary says, that the borehole was never used is the fact that the drilling project was not completed, despite the fact that it was begun at the outset of the decade of the 1980's. Claudio Humberto Rosa e Silva, spokesman for the Presidency of the Republic, also mentioned this date but was unable to supply any details concerning the inception of the borehole.

According to Rosa e Silva, the project was begun on orders from an official of the Ministry of Aeronautics without the knowledge of the then minister nor of the Aeronautics Technology Center (CTA). This official, the spokesman says, was involved in a secret operation of the secretary general of the defunct National Security Council.

#### **New Medical Research Reactor Under Development**

*PY1610002790 Rio de Janeiro O GLOBO in Portuguese 14 Oct 90 p 34*

[Text] Sao Paulo—The Reactor for Research and Medical Use (Repam) to be developed by the Navy will operate with one thermomegawatt of power and has its core specially positioned to direct a beam of radiation (in the case of neutrons) at the patient's head.

Rear Admiral Athon Luiz Pinheiro da Silva, the president of the Coordinating Board for Special Navy Projects (Copesp) and who is responsible for the development of the Repam, said that this reactor was designed according to the most advanced concepts of nuclear security in the world. One of the main concerns was to ensure that the reactor core could never melt down, not even in the worst accident.

The Repam will have its core refrigerated by water like the reactor of the Angra I Nuclear Plant and the prototype nuclear submarine reactor that is being developed by the Navy; however, its refrigeration process is quite unusual in that it has a natural circulation system driven by air [impulsionado pelo ar] which prevents the core from losing its refrigeration (water) even in an accident.

Pinheiro da Silva said that it took six months and a team of 15 Copesp technicians to develop the project. The reactor will use as fuel a combination of aluminum and enriched uranium which are the raw materials for the reactors currently in use in Brazil.

He added that the shield to be built around the reactor in the hospital must be at least 10 meters thick, and built of lead and concrete to shield against radioactivity.

### **CHILE**

#### **Arms Factory Reportedly Working on FAE Bombs**

##### **Company Statement**

*PY1210125990 Buenos Aires DYN in Spanish 1816 GMT 12 Oct 90*

[Text] Santiago, 12 Oct (REUTER)—The Chilean arms manufacturer who sold cluster bombs to Iraq during its war with Iran today reported that it is developing an explosive device that military experts believe to be up to five times as destructive as conventional bombs.

Cardoen Industries told REUTER that it is experimenting with a "fuel-air explosion" [preceding two

words in English] (FAE) bomb, a device that releases, upon impact, a cloud of fuel that explodes in a ball of fire once it reaches a critical density.

The Chilean arms manufacturer, however, denied having manufactured this type of bomb for Iraq. The statement delivered to REUTER indicates that tests carried out in Chile's northern desert are not convincing enough to start manufacturing the bomb yet.

"This project is now at the stage of preliminary studies. Static tests with various combinations of explosives and detonating substances are being conducted to obtain the FAE effect," Cardoen reported.

"We are not yet ready to produce a prototype of a FAE bomb, less still have we launched a marketing strategy for this product," the statement said. The company added that it is not planning to produce the bomb jointly with any other country.

FLIGHT INTERNATIONAL, a specialized British magazine reported on Wednesday that Iraq was developing the FAE bomb for use in a missile warhead. Quoting Western intelligence sources, the magazine reported that Iraq obtained the necessary technology while participating in the aborted Condor missile project together with Argentina and Egypt. FLIGHT INTERNATIONAL also reported that a missile warhead armed with a FAE bomb would be much more dangerous for Saudi Arabian oil fields than chemical weapons.

#### August Test Reported

*PY1510123090 Santiago Domestic Service in Spanish  
1000 GMT 15 Oct 90*

[Text] A Santiago morning newspaper has reported that the bomb called Fuel Air Explosive, FAE, which is being developed by the Chilean Company Cardoen, is as powerful as a tactical nuclear bomb.

The newspaper reported that the first FAE tests were carried out in August 1990 at the company's test range in a desert location east of Iquique, 1,057 km north of Santiago.

According to company sources, the FAE has existed since the 1960's and was used by U.S. troops in Vietnam.

#### Link With Libya, Iraq Denied

*PY1510231090 Santiago Domestic Service in Spanish  
2200 GMT 15 Oct 90*

[Text] Cardoen Industries today denied the sale of a powerful bomb to Libya. We have a report by Veronica Munoz from our mobile unit.

[Munoz] Ismael Vicuna, general manager of Cardoen Industries, has said that the company is not producing the powerful FAE [Fuel-Air Explosive] bomb, which is considered one of the most lethal explosives in the sphere of conventional weapons. He noted that this project is in a very preliminary research stage with the cooperation of the Spanish company (MS Systems). Press reports indicated that Cardoen Industries was manufacturing the FAE bomb and negotiating with Libya to sell the bomb to Iraq.

[Begin Vicuna recording] The FAE bomb is not being negotiated; it is not even being developed. It is in a very preliminary research stage, one of the many research projects the company is normally pursuing. Therefore, this bomb is not in the production or development stages, and there isn't even a prototype. [end recording]

[Munoz] Vicuna also said that the company's future strategy is currently being evaluated because the company has come to the conclusion that the military market is declining. He added that the idea is to guide the production of Cardoen Industries toward other areas, not only the production of weapons. He said that the company is not producing or selling any new military products, but added that the company does have a stock of products already made.

## INDIA

### Reporter Tells Usage of Dhruva, Cirus Reactors

90WD0781A Bombay THE TIMES OF INDIA  
in English 15 Aug 90 p 5

[Text] Bombay, August 14—Dhruva, the 100-megawatt research reactor at the Bhabha Atomic Research Centre (BARC) which completed five years on August 8, is expected to provide increased impetus to basic and applied research and to the production and application of radioisotopes in medicine, agriculture and industry.

Cirus, the 40-megawatt nuclear research reactor at the BARC completed 30 years of successful operation on July 10, 1990.

These two high neutron flux reactors have played a significant role in the development of various activities connected with the Indian nuclear programme.

While Cirus was built in the late 1950's with Canadian assistance, Dhruva is a completely indigenous effort. With the availability of Cirus in 1960, work on all facets of the nuclear fuel cycle was started at the BARC.

Right from the start, emphasis was placed on radiological protection of occupational workers and the public. A large number of personnel have been trained in Cirus and many of them occupy key positions in the Indian nuclear power programme. Cirus, therefore, can be truly termed as the nucleus of nuclear programme in India.

Both Cirus and Dhruva have been extensively utilised for the production of radioisotopes, development and testing of power reactor fuels and research in basic sciences. A wide range of radioisotopes, used in medicine, industry and agriculture are being regularly produced in Cirus and Dhruva. Presently, over 200 medical institutions in the country use these isotopes for diagnostic purposes.

Also, there are over 130 tele-therapy installations in India using cobalt-60 isotope sources produced in these reactors for the treatment of malignant tumours. Over 600 radiography cameras of various designs developed by BARC are in use in the country and over 250 industrial and pharmaceutical units are utilising the facilities for sterilisation of medical products by gamma radiations obtained from radioisotopes.

Testing of power reactor fuels has been carried out in research reactors under simulated conditions of high pressure and high temperature existing in nuclear power reactors. Study of various design and fabrication parameters and their influences on fuel performance and development of mixed-oxide fuels and thorium-based fuels are some examples of utilisation of research reactors.

In addition neutrons produced in Cirus and Dhruva are being extensively used in areas like condensed matter research, nuclear fission investigations and neutron activation analysis.

Neutron beam research at Trombay has been based on automated spectrometers designed and built entirely by BARC. The research work has been related to studies of the atomic structure of a range of materials from high-temperature super-conductors to biologically important systems.

Recently, dedicated computer-based fully automated spectrometers and new techniques like small angle neutron scattering have been developed. Neutron spectrometers have been supplied to many countries like Philippines, Thailand and Korea. A specially-built neutron spectrometer was installed by the BARC research group at the Rutherford Appleton Laboratories in the U.K.

Dhruva has now become a national facility and is open to all users in India.

Several students and teachers from various academic institutions are using the facilities in Cirus and Dhruva and interaction will be strengthened by the recent setting up of the inter-university consortium or DAE facilities.

### AEC Chief Iyengar on Setting Up of Soviet Reactors

90WD0782A Madras THE HINDU in English 5 Sep 90  
p 4

[Text] Madras, Sept. 4—The Chairman of the Atomic Energy Commission (AEC), Dr. P. K. Iyengar, today said most of that land acquisition has been completed for setting up two Soviet nuclear reactors of 1,000 MW capacity each at Koodangulam in Tamil Nadu and that he expected the first unit to go 'critical' by 1998.

He told THE HINDU that the detailed project report for the Koodanulam atomic power plant would be ready by October.

Answering a question of the uncertainty of the project with respect to the cost of the reactors, Dr. Iyengar said: "The prices have been finalised to some extent. This is what is called the upper limit. The price will be mentioned in the detailed project report."

The AEC Chairman who met the Tamil Nadu Chief Minister, Mr. M. Karunanidhi, this morning, described it as "a courtesy call."

On whether the State Government expressed support to the Koodangulam project, Dr. Iyengar said: "The Chief Minister very much expressed his support to it because Tamil Nadu is short of electricity and the project will be very helpful in the years to come. It will help farmers to energise their pumpsets and it can also develop small-scale industries in the drought-prone Nellai-Kattabomman district. There will be a lot of opportunities for the small-scale industries to come up, generating

more employment. A construction management team from the USSR visited Koodangulam recently to decide on the choice of various systems.

Had any agreement been finalised about the import of two reactors of 1,000 MW capacity each from France? "Nothing has happened. We are still continuing the dialogue," he said. There were many choices for the selection of sites for setting up these reactors if an agreement were to be finalised. They included sites in Maharashtra and Andhra Pradesh.

The AEC was also evaluating some of the sites suggested by the Kerala Electricity Board for setting up indigenous reactors of 500 MW capacity. "I do not know the exact location but it is in the North Malabar district."

'Accept small difficulties': Asked about the fears of the population in Nellai-Kattabomman district that the Koodangulam project might use up a lot of water from Pechiparai reservoir and thus affect cultivation, Dr. Iyengar said: "Any new technology will be looked at with suspicion by society. We know that the ultimate aim is to improve the living condition of the villagers. As long as these projects are properly planned, established in a technically sound manner and manned by competent people, there should be no fears. Certainly, it will not pollute the waters in Pechiparai. It will use some water from Pechiparai. But a major portion of the water that will be required is cooling water, which will be sea water. So one has to pay a price for new development. As long as it is totally beneficial in the end, society must learn to accept these small difficulties in the beginning.

"Who knows we may even be able to develop desalination technology which will improve the availability of water in that area (Koodangulam). Just as we have Metrowater (in Madras) pumping water from (aquifers) very near the sea, it may be possible to get water from the area when electricity is available."

The Zirconium and Titanium Sponge plant, being set up by the Department of Atomic Energy at a cost of Rs. 200 crores at Palayakayal village in Chidambaram district in Tamil Nadu, would begin production in three years. Work was under way. Land had been acquired. While zirconium was used in making zircoloy tubes in the fabrication of nuclear fuel, titanium was important as a general purpose, corrosion-resistant metal. It was one of the metals identified for future development of industrial products.

Dr. Iyengar said the first unit (235 MW) of the Kakrapar Atomic Power Project in Gujarat would attain criticality by August 1991. The second unit (235 MW) of the Narora Atomic Power Station in Uttar Pradesh would go on stream by February next year. The first unit at Narora which attained criticality in March, 1989, was working quite well and it was producing 75 per cent of power of its capacity.

Environmental clearance: Environmental clearance had been given for setting up two more reactors of 500 MW

each at Tarapur and work would start very soon. The detailed project report of the Prototype Fast Breeder Reactor (PFBR) to be set up at Kalpakkam, was under preparation. The PFBR (500 MW) would be operational by the end of the century.

Dr. Iyengar strongly refuted reports that India was importing heavy water from some countries including the USSR. On the press reports that India had imported heavy water from Norway, he said: "No way. We are self-sufficient in heavy water. We will build Pressurised Heavy Water Reactors (which would use uranium as fuel and heavy water as coolant and moderator) with our own heavy water." The heavy water plants at Manuguru in Andhra Pradesh and Hazire in Gujarat would start production in a few months.

## IRAN

### Atomic Energy Council Discusses Nuclear Reactors

LD0910205890 Tehran IRNA in English 1551 GMT  
9 Oct 90

[Text] Tehran, Oct. 9, IRNA—Iran's Atomic Energy Council chaired by President 'Ali Akbar Hashemi-Rafsanjani took some decisions Tuesday regarding completion of the semifinished nuclear reactor in Bushehr, southern Iran, and also on building of new ones. The council later heard a report read by Reza Amrollahi, head of the Atomic Energy Organization on the activities of his organization.

The Bushehr nuclear reactor on the Persian gulf was to be built by West Germany, but that country withdrew from the project when it was half-finished citing the outbreak of the Iraqi war as a pretext, and has refused to honour its commitments despite the end of the war and peace between the two countries.

### Nuclear Energy Official Reports IAEA Ruling

LD2909121990 Tehran Domestic Service in Persian  
1030 GMT 29 Sep 90

[Text] On the basis of a resolution proposed by the Islamic Republic of Iran, which was approved by the 34th annual conference of International Atomic Energy Agency [IAEA], any kind of military attack on nuclear installations under construction or in operation is banned.

Mr. Amrollahi, deputy president and the director of Iran's Atomic Energy Organization, when speaking at a press conference, referred to the resolution proposed by Iran. He said: According to the resolution, should there be an attack or a threat, the UN Security Council will, on the basis of the UN Charter, take the necessary steps.

Referring to the issue of nuclear energy providing the world's future energy, Mr. Amrollahi said: The present crisis and its effects on the price of oil is a warning to the



Third World countries to diversify and make use of all different types of energy. Referring to the fact that nuclear energy would help reduce reliance on oil, Mr. Amrollahi called on Iranian nuclear energy experts and researchers in foreign countries to return to their homeland so that their scientific knowledge may be used in the country's reconstruction.

#### **Official on FRG, USSR Nuclear Plant Links**

*LD2309131790 Tehran IRNA in English 0637 GMT  
23 Sep 90*

[Text] Vienna, Sept. 23, IRNA—Vice president and head of Iran's Atomic Energy Organisation (IAEO) Reza Amrollahi on Saturday criticised the West German Government's attitude towards the completion of the Bushehr nuclear power station in southern Iran.

He said in an interview with IRNA that Iran's cooperation with the Soviet Union for setting up of new nuclear plants as a "logical consequence of the unacceptable attitude of West Germany since the (1979) victory of the Islamic revolution. [no closing quotation marks as received]

Amrollahi warned that Iran was waiting for a final decision by the Bonn government on the issue "to take appropriate measures."

West Germany has put off completion of two power plants in Bushehr under various pretexts since 1979 and has also prevented cooperation of other countries such as Spain with Iran for completion of the semi-constructed projects.

The IAEO chief is currently here to take part in the 34th meeting of the general conference of the International Atomic Energy Agency (IAEA).

#### **Official Reviews Need for Nuclear Energy**

*LD1809192990 Tehran IRNA in English 1733 GMT  
18 Sep 90*

[Text] Tehran, Sep. 18, IRNA—Head of Iran's atomic energy organization Reza Amrollahi condemned the spirit of aggression in any form throughout the world at the 34th annual session of the International Atomic Energy Agency (IAEA) in Vienna today. Amrollahi who also serves as a deputy to the Iranian president, said that in the past the governments found it hard to agree to the views of the Iranian Government in relation with many topics but that the passing of time served to demonstrate the righteousness of the Islamic Republic's stand on those issues.

He said nuclear power generation is a practice with a sure future which is now beyond the reach of many countries. The Iranian atomic energy chief said in the past years the Islamic Republic had consistently emphasized the need for developing countries to have access to

nuclear energy, but that far from improving, the situation has aggravated as far as those countries are concerned.

He said despite the efforts of the IAEA, developing countries are still deprived of the nuclear power capacity, whereas, he said, the developed countries have markedly progressed in that area. Amrollahi observed that irrespective of political considerations the passing of time and the imposition of stricter safeguards have further complicated the nuclear industry and made it a very costly project even though in some of the developing countries no political barriers exist.

He said the stop in nuclear projects of the developing countries as well as the slow tempo of the creation of that industry in those countries is primarily due to financial reasons. The Iranian official told participants that for the first time in 1974 Iran officially demanded that the Middle East be declared an area without nuclear weapons, and that the Islamic Republic continues to adhere to that general stand. He said the development of nuclear power by the Zionist regime is a principal hindrance towards that goal.

Amrollahi said the atomic energy organization of Iran continues efforts for peaceful application of nuclear energy in the Islamic Republic. The Islamic Republic of Iran in cooperation with the IAEA is to host an international conference on "natural rays" in Ramsar in the Caspian province of Gilan November 2-7. The 34th assembly of IAEA member states started here Monday and will continue through Friday.

#### **Nation Elected to IAEA Board of Governors**

*LD2009164290 Tehran IRNA in English 1414 GMT  
20 Sep 90*

[Text] Tehran, Sept. 20, IRNA—The Islamic Republic of Iran was elected on Thursday [20 September] as a member of the board of governors of the International Atomic Energy Agency (IAEA) at its current 34th annual session in Vienna, Austria.

Iran was elected unanimously by the IAEA for the first time since the victory of the Islamic revolution in 1979 and is to represent the Middle East and South Asia.

The board of governors is the principal policy-making body of the agency and under its own authority approves all safeguards, agreements and important projects.

### **IRAQ**

#### **Photographs Said To Point to Uranium Mining**

*LD1310171490 London PRESS ASSOCIATION  
in English 1625 GMT 13 Oct 90*

[Text] Iraq was feared tonight to be mining uranium for use in nuclear weapons production.

Freelance film maker Gwynne Roberts said evidence, including photographs taken by a Soviet spy satellite, indicated Iraq had mines in its northern Gara mountains. For his ITN report screened on Channel 4's *The World This Week*, Mr. Roberts talked to Kurds who claimed Iraqi President Saddam Husayn had regularly visited the site, about 40 miles south of the Turkish border.

One unnamed source said: "The exact spot is not known but that it is in northern Iraq is something that has been verified by Iraqi exile sources, Iraqi defectors and intelligence sources all over the world."

In a bid to pinpoint the location of the mines, Mr. Roberts used Soviet spy satellite pictures combined with a computer technique developed by University College, London. Analysing the images, Imperial College, London, mineralogist John Moore said: "You can see a relatively wide new road which has been driven up the hillside here to an area of excavation there. On this hillside there are two...mine entrances nearby."

A building appears on the images near the mine entrances, which, said Paul Halliwell of the European Nuclear Proliferation Information Centre, "looks like a uranium milling plant...to produce about a ton of uranium."

Richard Macklin of the Uranium Institute said if the images did indicate the existence of uranium mines, "having a supply of uranium ore can allow you to have within your own country everything you need to develop a weapon."

## PAKISTAN

### Foreign Office Denies Report on Nuclear Furnaces

BK1310155490 *Islamabad Domestic Service in Urdu*  
1500 GMT 13 Oct 90

[Text] A Foreign Office spokesman in Islamabad has described as baseless and mischievous the WASHINGTON POST report alleging Pakistan had made a clandestine attempt to acquire two high temperature furnaces which, according to the paper, could be used to produce nuclear weapons. The spokesman regretted that there are elements and groups operating in the United States who have the obvious intentions of creating apprehensions and misgivings about Pakistan's peaceful nuclear program.

### Minister Discusses Nuclear Nonproliferation Stance

BK1310114790 *Islamabad THE PAKISTAN TIMES*  
in English 13 Oct 90 p 1

[By Shahid Saleem]

[Text] Islamabad, Oct. 12—The Foreign Minister, Sahabzada Yaqub Khan, has said that Pakistan wanted

to make South Asia a genuine nuclear non-proliferation region and has put up proposals which should be properly attended to.

The Foreign Minister drew attention of the United States Secretary of State James Baker towards Pakistan's proposals already put forth for a long time during their recent meeting in the USA.

Both the leaders exchanged views on a number of important subjects of interest and concern to both the countries.

The Foreign Minister, who attended 45th session of United Nations General Assembly in New York on return to Pakistan said that he briefed Mr. James Baker on Pakistan's efforts to maintain dialogue with India and the efforts under way to resolve the Afghanistan problem and the present situation in the Persian Gulf.

He said that bilateral ties figured in the talks during which Mr. Baker expressed his concern regarding Pakistan's nuclear programme and its possible fall out on American assistance.

The Foreign Minister explained Pakistan's nuclear programme for peaceful purposes and assured him that Pakistan neither possesses nuclear weapons nor has any intention to make nuclear weapons. Sahabzada Yaqub Khan said that in this regard he drew his attention to Pakistan's proposals aimed at briefing about a genuine non-proliferation region in South Asia.

Talking about the Pressler amendment certificate, the Foreign Minister said that this is presently under review by the U.S. Administration. He said that high level discussions are going on between the two countries to resolve the issue.

He described his talks with his Soviet counterpart, Eduard Shevardnadze "cordial and fruitful" and said that he discussed with him the new global order, disarmament, the Persian Gulf, Afghanistan and non-proliferation in South Asia.

"We also had a survey of the world scene which covered an interchange of views on a number of other important subjects".

Sahabzada Yaqub Khan said that the Soviet Union has a genuine desire to intensify and expand relations with us.

He said that this was a desire which we warmly reciprocate. The Foreign Minister expressed his happiness over consensus resolution on Afghanistan which, he said, "augurs well for future endeavours to reach a just and durable settlement of the Afghanistan problem which should be acceptable to the overwhelming majority of the people of Afghanistan". Sahabzada Yaqub Khan during his stay in New York held talks with a large number of Foreign Ministers from Islamic and other countries and briefed them on the situation in the region.

Sahabzada Yaqub Khan particularly highlighted the situation in the Indian occupied Kashmir where the people have risen to demand their right of self-determination. He also told them about India's repressive measures against the people of Kashmir. He briefed them about massing of Indian troops on Pakistan's borders which had created "tensions" in Pakistan-India relations.

The Foreign Minister also held a meeting with the UN Secretary General Mr. Perez de Cuellar, Foreign Min-

ister of People's Republic of China Mr. Qian Qichen, Foreign Minister of Iran, Dr. Ali Akbar Velayati, Turkish Foreign Minister Mr. Ali Bozer and Saudi Foreign Minister Prince Sa'ud al-Faysal. Sahabzada Yaqub Khan discussed with them matters of mutual interest and briefed them in detail on the situation in Indian occupied Kashmir, Afghanistan and the situation in Gulf which threatens the peace and stability of the entire region.

### Concern Expressed Over Arms Race in Third World

LD1110150190 Moscow KRASNAYA ZVEZDA (first edition) in Russian 10 Oct 90 p 3

[Report by A. Balusov: "Risky Gambles: The Arms Race Continues in the 'Third World'"]

[Excerpts] In the past few days certain mass media sources in the Arab countries have reported that Egypt, Saudi Arabia, the United Arab Emirates, and Qatar are reviewing their relationship with the Arab Military Industry Organization [AMIO]. An official report on its revitalization is expected in the near future. [passage omitted]

It is possible that the report on the readiness of four Arab states to breathe new life into the AMIO would not have attracted any particular attention if it had come two or three months before, or if the matter had only concerned those countries.

The decision by Egypt's former partners to change their relationship with Egypt at this time, after unsuccessful attempts by the Egyptians over many years to convince them of the need to revitalize cooperation within the framework of the organization, testifies to the fact that a change in military and political guidelines is occurring in the region under the influence of the Iraqi aggression against Kuwait, when a real danger has threatened the oil-rich Arab countries of the Persian Gulf. As far as the consequences of such a decision are concerned, a broader view of things shows that what is involved here is a highly dangerous trend that has recently become widespread not just in the Arab countries, but also in the "Third World" as a whole. This trend is connected with the arms race that is gaining in force and speed and is embracing the developing countries.

The French journal LE MONDE DIPLOMATIQUE cites facts from the Stockholm International Peace Research Institute which demand that this problem be looked at in a new light. At least 10 countries now have programs to develop ballistic missiles. They include Egypt, Iraq, Iran, Israel, Pakistan, and others. According to the institute's assessments, 12 "Third World" countries will acquire the possibility of manufacturing nuclear weapons in the next few years, or are trying to obtain the materials and resources necessary for this purpose.

A recent report from Brazil could not fail to draw the world community's attention in this respect. It follows from this report that that Latin American country has been carrying out work to develop nuclear weapons for some time now.

Do we need to talk about what the proliferation of mass destruction weapons and delivery vehicles could lead to? The events in the Persian Gulf are clearly demonstrating the consequences that mankind could suffer if new lethal weapons fall into the hands of arrogant, ambitious leaders, who are no rarity in the "Third World." The

proliferation of state-of-the-art weapons is enabling developing countries to wage protracted, large-scale wars, creating preconditions for the emergence of "Third World superpowers" with their own particular spheres of influence and giving rise to new conflicts and new problems. [passage omitted]

In this connection it is probably time to start thinking about the creation of effective international mechanisms to monitor the nonproliferation of mass destruction weapons and delivery systems. It is also time to think about determining criteria for defense sufficiency. USSR Foreign Minister E.A. Shevardnadze spoke about this in his address at the 45th UN General Assembly session. In the world of today, which is so interlinked and so interdependent, the level of armaments of a particular country cannot remain its own exclusive right and prerogative. This could cost the world too high a price. The arms game could turn out to be too risky.

### Case Drags On Against Nuclear Power Station Equipment Supplier

904E0150Z Moscow TRUD in Russian 16 Sep 90 p 2

[Article by P. Penezhko: "A Criminal Situation: The 'Skidding' Suit; Why Isn't There Effective Procurator's Supervision of AES's?"]

[Text] At the beginning of this year a paper arrived at USSR Gosarbitrazh signed by the minister of heavy machine-building, V.M. Velichko, and his colleague in charge of the USSR Ministry of Nuclear Power and Industry, V.F. Konovalov. It discussed the dismissal of financial suits against the Podol'sk Machine-Building Factory, which essentially has produced defective steam generators for nuclear electric power plants. According to the highest-level decision, the losses should be charged "to the production costs of electricity, and to a review, where necessary, of the design and economic features of AES's [nuclear electric power stations]."

Meanwhile, the typewriter at the city procurator's office of Yuzhno-Ukrainsk, Nikolayevskiy oblast, clatters like a machine gun: "At present, ten steam generators produced by the Podol'sk Machine-Building Factory in Ordzhonikidze of the USSR Ministry of Heavy Machine-Building are out of operation at AES's. Each one costs over 3.5 million rubles. The resulting loss to the national economy at our power station alone is about 40 million rubles. USSR Goskomtsen [State Committee for Prices] set an incentive bonus of 110,000 rubles over its cost when this model was awarded the state Quality Symbol in 1986. Nuclear power plants paid it without mumbling. However, very brief operation of the steam generators revealed that the Quality Symbol was awarded prematurely, to put it lightly. It was revoked, but for some reason USSR Goskomtsen did not think about the fact that the factory should return the unearned money to its buyers; that this money, in essence, was an incentive to careless workers. Procurator of the city of Yuzhno-Ukrainsk, junior justice counselor, D. Molchanov."



We met each other in Moscow. He paced his hotel room nervously, having just returned from a hearing on the case in arbitration. Again it ended in nothing.

"There is no law on nuclear power. It's a shame! We were the first in the world to build AES's, and in Japan, West Germany, France and the USA nuclear legislation was adopted in the 1940's and 1950's..."

"Don't we have enough ineffective laws? Including 'perestroika' ones."

"But even so they can never legally do what they are now shamelessly thinking up. A draft law was written six years ago in the Institute of State and Law which took into consideration all international experience. If the top authorities had adopted it then, Chernobyl probably would not have happened. For example, it has a provision prohibiting any type of unauthorized experiments at nuclear power stations. But the most important part of it was that both Gospromatomnadzor [State Industrial Atomic Inspection] and the KGB would inform the procurator's office of all violations in AES operations..."

"Whom do they inform now?"

"I think it's still the party organs. I'm in the position of the "Chernobyl" procurator, D. Polishchuk, who from 1981 right up to the disaster knew nothing about the systematic violations of safety regulations and the numerous shutdowns of the blocks due to the operators' fault..."

"From a personal standpoint, it's probably possible to understand the nuclear power people, who are not eager to be candid with you. In the popular conception, the procurator is primarily a prosecutor, with whom it's better not to have any dealings."

"I disagree. What is more, the trade unions also inform no one about the events at the stations. So what are we supposed to make of that?"

"Maybe they're willing to accept it?"

"Well, I'm not! All I had to do was approach this touchy question—safety—and the station's management told me it's none of my business, that I'm not competent, that they have two dozen supervisors handling this, including seven Gospromatomnadzor inspectors. They even reminded me that their salary is higher than mine. So, it turns out that there's no place for the procurator's supervision..."

But let's go back to Molchanov's suit against the Podol'sk factory. Upon finding out that the faulty generators were being replaced, the procurator demanded the documents describing the causes of this "incident" (as it is now referred to by the nuclear power people), so unfortunate for the treasury and dangerous for the public.

For fully understandable reasons—everyone remembers Chernobyl—the station did not resist. The papers quite clearly showed: the ruptures in the steam generators'

collectors were due to faulty design and manufacturing at the Podol'sk factory. However, the factory sent an even larger pile of documents claiming that the station was responsible for everything, that it was allowing deviations in the second loop's chemical medium. Then, experts of the USSR Academy of Sciences and the Ukrainian Academy reached a "Solomon's" conclusion and combined all three factors: design, manufacture and improper medium.

This just doesn't happen, the procurator said to himself. Someone must bear the greater responsibility. Deciding to conduct his own study, he asked for help from a professor at the department of nuclear electric power stations of the Moscow Energy Institute, V. Gorbatiy. But he wanted 10,000 to conduct the scientific study. Where was Molchanov supposed to come up with that kind of money?...

He then turned to the Nikolayevskiy Ship-Building Institute, a recognized authority in steam generator research, where they informed him without charge that the composition of the second loop's medium in this case bears no relation to an accident. The Odessa Technological Institute confirmed: the design and manufacture of the collectors is wholly responsible. Finally, doctor of physical-mathematical sciences V. Rybin conducted a study at the Yuzno-Ukrainskaya AES and confirmed his colleagues' opinion. UkSSR Academy of Sciences corresponding members O. Romaniv and A. Andriykevich, and doctor of technical sciences G. Nikiforchin, agreed. Molchanov calculated that if the loss from replacing all the faulty steam generators were added to the electricity not produced during the downtime, the total would approach a billion rubles! Isn't this cause for a suit against the factory?

The city procurator of Yuzhno-Ukrainsk at that point did not yet know that there is already "experience" in such a suit, demonstrating its complete and demoralizing futility. And what can a city procurator do if a USSR ministry has not been able to achieve anything? This is in reference to the now-retired minister of nuclear power N. Lukonin, who demanded of the designers of "Gidropressa" (Minsredmash [Ministry of Medium Machine-Building]) and the Podol'sk machine-builders that they compensate the losses of the Novovoronezh AES, whose steam generators cost them over 14 million. Minsredmash was at that time headed by L. Ryabev. The head of Mintyazhmash [Ministry of Heavy Machine-Building] was and remains V. Velichko. They both assured Lukonin that the design and manufacture of the steam generators would be changed and their reliability upgraded.

Meanwhile, Gosarbitrazh delayed and delayed reviewing the case, until L. Ryabev shifted chairs to chairman of the USSR Council of Ministers' Bureau for the Fuel and Energy Complex and merged Minatomenergo with Minsredmash, after forcing the bothersome Lukonin into retirement. The Novovoronezh suit languished in this new bureaucratic "cocktail" in which the plaintiff and

defendant were reshuffled. And everything would have been fine if this pesky Yuzhno-Ukrainsk procurator hadn't suddenly shown up...

If the minister has found justice, who needs some city procurator?... A threatening letter went from Minatomenergoprom to Gosarbitrazh, to the effect that since the entire billion-ruble loss from the 26 faulty steam generators had been included in the electricity production cost, then there could be no discussion of any new suits. Molchanov's suit, naturally, "skidded" to a halt.

The communications with the Academy of Sciences went another round. It did not deny the procurator's investigative results, but did not want to name those responsible. And in principle that is not its business—that's for the court to decide. But could you imagine our glorious ministers in the dock? Even for the fact that their enterprises are supplying nuclear power stations with unreliable and downright dangerous equipment?! No, as a rule it's the men at the switch who are held responsible for everything...

For now, the steam generators are driving the nuclear power stations "to the pump," as they say. Like many collective and state farms, they have been shifted to operating at a planned loss (Yuzhno-Ukrainskaya, Novovoronezhskaya, Balakovskaya and Zaporozhskaya). Last year they were allocated 25 million rubles from the state budget. Isn't this the source of comments that our electricity is far too cheap and that its price should be raised?

From the moment Molchanov first crossed the threshold of the Yuzhno-Ukrainsk AES he has never ceased to be amazed at how easily unearned money is taken from the station. The designers of the Kharkov branch of "Atomenergoprojekt" received over 200,000 for the high quality of the third block. Yet when construction began they found 1600(!) errors. According to the design, 213 dosimetric monitoring holes were to be drilled around the block. And suddenly a joint suggestion comes from the dosimetry office and the designers themselves: 90 holes are more than enough. The state pays for the "savings" without complaining.

But according to common sense the source of the "savings" is either slipshod predesign research or a clear contempt for safety. In either case, it's poor work, which is rewarded in some twisted manner.

"Maybe they deliberately design all sorts of stupidities," Molchanov thinks in confusion, "in order to appear to be efficiency experts, to not be idle, and to show society that they're necessary?"

Molchanov's primary education was as an engineer. Therefore, when he saw a crack with "diverging edges" in the 170-millimeter steel wall of the steam generator's collector, he knew right away that it was the result of great internal stress. In some ways, similar to the stress imposed on him from supervising an AES. After all, its

director is subordinate to the union ministry, which means that a city procurator must take his protest up all the hierarchical steps to the minister. And the wastebasket catches each of his protests.

Molchanov was preparing to check out of the "Rossiya" hotel when he suddenly saw people moving towards the Spassky tower with posters saying "Save our children!" They were residents of the Belorussian regions affected by radiation. He slipped into the crowd and went into the Council of Ministers with them. He took the floor. "There must be a law on nuclear power," he said. "The supervisory agencies will then have serious authority, and a procurator can effectively supervise compliance by the AES management and the supervisory agencies."

"I don't want," he said, "people to receive medals and awards for eliminating the consequences of a disaster. I want power plants to operate safely, and for my two-year old son to never experience what those of his age at Chernobyl had to deal with."

...And so, the procurator of a small Ukrainian town against two union ministers. A year or two ago the outcome of such a fight would have been preordained. Today, it's hard to predict. The range of hope is expanding (one wants to believe).

P.S. While this material was being prepared for publication, events continued to develop. The USSR General Procurator, A. Ya. Sukharev, recently received a very aggressive "Statement" from the Podol'sk machine-builders. The careless workers, from senior engineer Babashkin to furnace operator Starostin (89 signatures in all) complained that "the pressure from the procurator of Yuzhno-Ukrainsk, D.N. Molchanov, on USSR Gosarbitrazh continues to build," and it is therefore time to make him answerable.

Well, Molchanov is prepared at any moment to answer with experts' documents in hand. But what has made the machine-builders so worried? Whose principles worry them: those of the Gosarbitrazh inspectors, or their own? And by the way, it's encouraging that the 89 signatures are, after all, not the entire factory. There are honest people in Podol'sk as well...

### Growing Nuclear Proliferation Threat Seen

91WP00 7A Moscow *RABOCHAYA TRIBUNA*  
in Russian 20 Sep 90 p 3

[Article by V. Makarchev: "Percentage of Hope"]

[Text] The fourth conference on reviewing the effects of the Treaty on the Non-Proliferation of Nuclear Weapons ended in Geneva without adopting a concluding document, even though its chairman, Oswaldo de Rivero, announced on the last day that the summary declaration was "95 percent ready".

The final plenary meeting of the conference, which lasted for 11 hours and ended at 0500 hours on Saturday

morning, was an unusual sight. The exhausted journalists and a few diplomats sat in small groups in the half-empty hall. In the buffet the bartenders could not brew the coffee fast enough to keep up with the demand. At the same time, sharp discussions were going on in the Swedish legation—a compromise was being worked out in the tight circle. They could not correlate the positions of the United States and Mexico, which ultimately made it impossible to achieve a concluding document. The delegation from Mexico insisted that the nuclear powers who were parties to the treaty promise to conclude a comprehensive agreement on the cessation of all nuclear testing in the next five years. Mexico was supported by a number of nonaligned countries. The United States, in turn, was not ready to give any such guarantees. According to the announcements of a number of Washington administrations which had replaced one another, the United States preferred to withdraw from the Treaty on the Non-Proliferation of Nuclear Weapons rather than reject nuclear testing. Especially since two nuclear powers—France and China—were not participants in the treaty.

The first term of the treaty's effectiveness expires in 1995, and it will be necessary to decide whether to make it limitless or to renew it for some specific period of time.

In the latter case, noted John Simpson, a member of the conference secretariat's group of experts, in his discussion with our TASS correspondent, a variant of its extension is possible, say for a year or even 3 months. After this it will no longer be in effect. Especially since the decision, according to procedure, will be made by a simple majority. Today, in Simpson's words, over 50 countries have the technological capacity to produce nuclear weapons. If the treaty ceases to exist, an entirely new situation will be created in the world, and regional conflicts will be sharply exacerbated.

Evidently, efforts will be made in the near future to achieve a comprehensive Treaty on Banning Nuclear Testing within the framework of the Geneva Conference on Disarmament. This would obligate France and China with certain responsibilities outside the framework of the Treaty on Non-Proliferation.

The entire structure of international security is changing, conditioned by the relaxation of tensions between the United States and USSR. Making use of this fact, the nonaligned countries are ever more persistently presenting their demands, even by means of placing in question one of the key treaties in the sphere of control over nonproliferation of nuclear weapons.

## GERMANY

**Aid to Iraq on Missile Projects Reported**

AU1510154590 Hamburg DER SPIEGEL in German  
15 Oct 90 pp 148-149

[Unattributed report: "With God's Help"]

[Text] Entrepreneur Holger Beaujean, 42, from Stutensee near Karlsruhe, is industrious like a true man from Baden. He is often already in his office at 0630 in the morning and sometimes he stays there until long after midnight. Within only a few years he founded two flourishing companies. He is also the person responsible for radiation protection in his own companies.

Such a man is known not only in his own land. The expert engineer for control and regulation technology was asked to come to Chernobyl in the Ukraine to build a decontamination station. The value of the order: About 1 million German marks [DM]. Color photos show him in front of the sarcophagus of the burned out reactor—souvenir photos just as in a family album.

In another photo he squats on the bank of the contaminated Pripyat River, which cools the power plant, and calmly holds a fishing rod in the water. "A person is exposed to more radiation in any aircraft," the expert says.

For a few weeks now Beaujean has been worried; the upward progress of the dauntless man seems suddenly to be over. The Federal Intelligence Service has a lot of material about him, and so does the Cologne Customs Institute of Criminal Investigation. The Karlsruhe Customs Investigation and Public Prosecutor Peter Zimmermann are interested in the deals of the clever entrepreneur. Investigators searched his offices, and a regular investigation procedure has been started.

Expert Beaujean is suspected of having helped Iraq in important missile projects. At the moment, the kind of security systems he allegedly developed for al-Falluja, which is crammed full of chemical facilities and missiles, is also being investigated.

The case, with the file name 52Js 224/90, is exemplary for the affair concerning German arms exports to Iraq. Like Beaujean, quite a number of other entrepreneurs tried to conclude dubious deals with the martinet Saddam Husayn, because they hoped for enormous profits.

Generally, up to 150-percent surcharges were calculated for deals with Iraq; in the case of sensitive projects, entrepreneurs who dared to accept the risk were permitted to double this margin.

Deliveries to the Middle East had been a profitable business for years. In 1982 German experts achieved a turnover of almost DM8 billion in Iraq. Last year, when the war between Iraq and Iran was over, the FRG still

delivered—without illegal deliveries—goods worth DM2.2 billion. Thus, Germany was Iraq's most important partner within the EC.

This makes the great energy that newcomers such as Beaujean expended on the Iraq business understandable, since the struggle there is pursued with extremely tough means.

In December 1988 Beaujean established first contacts with influential Iraqis. At that time Havert Consult Project Engineering and Consulting GmbH from Neu-Isenburg asked him for help in negotiations with Nassr State Enterprise for Mechanical Industries. Nassr is a well-known address in the field of armament. Havert paid for the tickets for the engineer.

Before the flight the people from Havert made an agreement with Beaujean. It was agreed that he would conduct all further Iraq deals only with Havert because, as the company stated later, it did not want to "pave the way to the Iraqi market," Havert's "actual domain," for a potential competitor.

In August 1989 Beaujean canceled the agreement because it was "much too empty and vague to become legally effective."

Subsequently, both parties attacked each other like scorpions and Beaujean won. "Only as an aside" and "just to make things clear," he mentioned that his Iraq deals were not conducted via his engineering office, Beaujean Consulting Engineers, but via his second company, Anlagen Bau Contor (ABC), which was founded at the end of 1988—thus, Havert's blow struck only empty air.

Beaujean's stakes in the business game were well placed. Within just a few months projects worth a total value of DM7,153,762 were planned together with Nassr State Enterprise, projects involving everything from valve test stands to laboratory equipment. For training on site alone Beaujean put DM1,000 per day and a man on the bill, excluding expenses.

The Iraqis were very interested in the versatile German engineer. Beaujean also is a nuclear power expert, an expert in the separation of the inert gas krypton. He worked in the nuclear research centers of Juelich and Karlsruhe. "I am known in the nuclear technology Mafia," he says self-confidently. He developed the flue-gas facility for the Wackersdorf nuclear recycling plant.

He is linked with the nuclear industry even in musical terms. The Chamber Orchestra of German Nuclear Engineers, the "Camerate Nucleare" (its symbol: a violin with electrons), which was founded in 1986, is still grateful to him for financial donations.

In the Iraq deal, too, Beaujean stuck to the rules of the game. In an appendix to his contract with the Iraqis he committed himself in 1989 to giving four Toyota cross-country trucks (four-wheel drive, air conditioning, turbo-diesel) for free.



In lieu of an oath he had to give assurances that "no Israeli components and no Israeli raw materials" are "used for the production of the goods," "as well as that no Israeli sources are involved with labor or capital."

The contract with Nassr was concluded for a project with the cover label 1728. In intelligence service circles this project is well known as a program for the acquisition of high-capacity missile drives.

As a result of this project, which has been pursued for years, the archenemy Israel has come within range of Iraqi warheads. Saddam Husayn's threat that "when the time of reckoning comes," he will use a new missile against Israel must be taken seriously also because of project 1728.

The only thing that is wrong is the dictator's claim that the weapon has been developed "with God's help." It was above all the Germans who developed new fuel and additional fuel tanks for project 1728. This resulted in a considerable increase in range, in addition to reducing the payload.

Investigations of the alleged participation in project 1728 have already been started against Bonn Inwako chief Friedrich-Simon Heiner and his Kiel partner Klaus Weihe. Leifeld and Company from Ahlen also came up on the investigators' scope because of this secret project.

Both the people from Leifeld and Beaujean had good contacts with the head of project 1728, a certain Dr. Sabha Modher [spelling as published]. The Iraqi, who is the director of Nassr, is the driving force of the armament project; it is considered certain that the Israeli intelligence service Mossad has him literally targeted. Modher himself has made sure that Beaujean's employee Christian Tauber, who was detained in Baghdad, was permitted to return to the FRG unexpectedly quickly and unharmed in August.

For Modher, camouflage is part of business. He is known for preferring to issue so-called end-user certificates that pretend that deliveries of arms technology are destined for civilian projects, in the oil industry, for instance.

Beaujean's deals are obviously involved in projects in the area of fuel. The Karlsruhe public prosecutor's office has assigned an expert to evaluate the documents.

It is striking that in the plans "kerosene," "hydrazine," and "water" are flowing together and temperatures of 1,000 degrees are downgraded to 300 degrees centigrade. Beaujean's largest project for 1728, which is calculated at about DM3 million, for instance, was declared to be a waste water facility. The entrepreneur claims "not to have known" of any military use: "After all," Beaujean says, "everything was civil engineering."

Deliveries by Beaujean for a second deal with Iraq were shipped in July. The engineer has worked out a fire protection and gas warning system for al-Falluja, where, 50 km west of Baghdad, basic substances for nerve gases

are produced in chemical factories that have been built with German help. Missiles surround the building.

The Iraqi strategists are certainly capable of learning, as is shown by Beaujean's deal with the Al Fao Establishment: They drew the consequences from an explosion in 1989. At that time, 700 people were reportedly killed in a disaster in the El Hilla [spelling as published] missile factory, because fire protection did not work.

Now the fire is blazing among the German exporters to Iraq. Investigations have been initiated against more than 30 companies, more than 40 enterprises are suffering heavy losses in payments because of the embargo. They are demanding—so far in vain—the payment of damages from the FRG Government. About 20 companies consider their existence in danger; Saddam's helpers are also in difficulties.

Havert company from Neu-Isenburg, which quarreled with Beaujean, reported to Bonn that it has had to practically cease business operations. If things get worse, the public prosecutor will also pay a visit—because of project 1728.

The company Graeser from Fischbachtal in Hesse, which mediated the deal for a cannon factory, which was declared to be a multi-purpose forge, to Ferrostaal of Essen, told Bonn that it is "considerably affected." At Graeser, too, there are indications of 1728; there the investigators discovered an important trail that lead to Beaujean.

CBV Blumhardt from Wuppertal, which had delivered hundreds of special transporters to Iraq during the Gulf War—with which the Iraqis transported their tanks to the front for their attacks—has now gone on the defensive.

The delivery of 75 so-called oil field low loader semi-trailers [Oelfeld-Tieflade-Sattelanhaenger] was agreed on for the second half of 1990. The parts for the special vehicles were "specially made." Now, as the company complains, they are "mostly" useless. The situation is "life-threatening."

Leifeld suffered the harshest consequences as a result of the 1728 case. The company, 99 percent of which belonged to four holding companies from the surroundings of the Matuschka group in Munich, was immediately sold to the Westfalenbank after the Iraq connection became known.

The fighter Beaujean is currently considering whether to sue the Federal Economic Office, which is responsible for the export permits, for damages: "They know all our projects and did not intervene," he said.

## FINLAND

**Loviisa Nuclear Waste Bound for USSR**

*LD1010211990 Helsinki Domestic Service in Finnish  
1400 GMT 10 Oct 90*

[Text] Used fuel from the Loviisa nuclear power station will again be taken at the end of this month to the Soviet Union. A special Soviet train carrying the fuel will come to Loviisa in the middle of next week to fetch 23 tonnes of nuclear waste. Imatran Voima [power company] and the Soviets at Loviisa have contracted to remove all the used fuel from Loviisa the entire time the station is used. Other active waste from the nuclear plant, however, will have to be placed by Imatran Voima in underground stores.

## IRELAND

**Government Urged To Take Action Over Sellafield**

*90WP0159A Dublin IRISH INDEPENDENT in English  
31 Jul 90 p 5*

[Article by Tony O'Brien: "Sellafield: New Call for legal Action"]

[Text] The government has again been urged to take international legal action against the British authorities over Sellafield following revelations that the nuclear reprocessing plant may be an even bigger threat than was thought.

Opponents argue that even if Ireland did not win a case in the courts, at least the Sellafield issue would be raised in an international forum.

But Energy Minister Robert Molloy insisted it was too early to go to the European Court because the government wanted to be sure of winning the case. He maintained that progress had been made towards setting up an EC-wide nuclear inspectorate.

The new row follows a report by the Friends of the Earth group in Britain, which claims that people living as far as 40 miles south of Sellafield in Cumbria may be at risk from unacceptably high radiation exposure.

The latest revelations, coupled with new fears about extra shipments of spent nuclear fuel in the Irish Sea, prompted Greenpeace in Ireland to call on the government to take legal action.

Spokesman Ms Helen Kinghan said that even if Ireland lost its case in Europe, it would be an important publicity battle, a view backed up by Fine Gael spokesman Richard Bruton, who said: "Even if we do not win, we would be raising the issue internationally."

Ms Kinghan pointed out that Sellafield was now reprocessing spent nuclear fuel from as far away as Japan, and

a planned new reprocessing plant there would increase both air and sea emissions in the next few years.

Eleven potentially deadly cargoes had sailed past Tuskar Rock, off Co. Wexford, already this year, she charged, compared to only two last year.

## UNITED KINGDOM

**Dounreay Reprocessing of European Fuel Discussed**

*90WP0161A London THE DAILY TELEGRAPH  
in English 14 Aug 90 p 2*

[Article by Roger Highfield: "Dounreay in Reprocessing Negotiations"]

[Text] Discussions are going on between the Atomic Energy Authority and several European countries about a deal to reprocess their nuclear waste in Dounreay, Scotland.

The authority and Germany's Hahn-Meitner Institute—location of a nuclear research reactor—have discussed a contract under which the Dounreay would reprocess the reactor's spent fuel.

Spain's two reactors near Madrid, and the European Commission's high flux reactor, at Petten, in Holland, are also involved in negotiations.

Dounreay has reprocessed spent nuclear fuel from Pluto and Dido, two materials test reactors at Harwell, Oxfordshire. But since the reactors closed, it has spare reprocessing capacity.

Fuel from these research reactors would not be suitable for treatment by British Nuclear Fuels at Sellafield.

The reactors are running out of storage space. With the full agreement of the government, Dounreay's fuel services business has made an offer to store spent fuel from these reactors for up to four years with an option to reprocess, if necessary. The decision will be made by 1994.

A spokesman for the authority said: "Even if Dounreay's plant is operating at full capacity, the total amount of material reprocessed represents a tiny fraction in volume terms of the UK's nuclear industry reprocessing capacity."

However, he would not give any estimate of the value of the contracts or the earliest the fuel could arrive in Dounreay.

**Commons Energy Panel Scores Nuclear Power Program**

*90WP0160A London THE DAILY TELEGRAPH  
in English 14 Aug 90 p 2*

[Article by Roland Gribben: "Nuclear Power Research Under Fire From MP's"]

[Text] The Energy Department is still spending too much on nuclear power research despite the mothballing of

atomic plant plans, the Commons Energy Select Committee said in a report yesterday. It called for a far-reaching review of the department's research budget because of changes in the energy outlook.

The all-party group of MP's also urged a speed-up of a two-year investigation into spending on wave power, now running at £200,000 a year.

They said they doubted whether a research and development programme which involved spending three times as much on nuclear projects than all other schemes put together was a "good reflection" of future energy needs.

Nuclear research spending in the present tax year will total £129 million—72 percent of the research budget.

The committee says it is unsatisfactory that some of the non-nuclear spending, particularly on coal projects, is conditional on industrial partners being found, while nuclear research did not depend on outside aid.

Careful consideration should be given to continuing support for the joint European Torus fusion power project.

The department had to go weigh up the considerable costs of continuing research for another 60 years against the potential benefits of a technology which would not be available until the second half of the next century and may prove "never to be possible."

The report also questions estimates about the amount of money the Atomic Energy Authority will spend on closing its nuclear plants and says that on present estimates the £3 billion budget will be higher.

A review of wave power spending, under way in the department, should also cover the lessons from the Salter's Duck project, the MP's say.

If the review found "significant errors" in the assessments of wave energy an independent body should be set-up to see whether there was any "deliberate distortion of evidence."

Supporters of the Duck project have alleged that the Energy Technology Support Unit at Harwell distorted evidence about the potential generating costs and reliability to "make it appear economically unpromising and justify cutting off funding."

The unit has emphatically rejected charges that millions of pounds of public money had been wrongly diverted from wave energy research to less appropriate uses.

#### **Treatment Plant for High-Level Nuclear Waste Opens**

90WP0163A London *THE DAILY TELEGRAPH*  
in English 15 Aug 90 p 4

[Article by Roger Highfield, science editor]

[Text] Britain's first full-scale treatment plant for high-level radioactive waste is now in operation, British Nuclear Fuels has announced.

The Plant opens the way to the return of nuclear waste to foreign countries, some decades after it first arrived in this country.

Radioactive liquid has been fed into the £240 million plant operated by British Nuclear Fuels at Sellafield, Cumbria.

The nuclear waste, that accumulated from reprocessing for the past 30 years, and from the forthcoming Thorp processing plant, will be converted into glass blocks by the Windscale Vitrification Plant at Sellafield.

Some blocks will be returned to Japan and Italy—almost 30 years after both started shipping spent nuclear fuel to Sellafield—once a suitable flask to transport the vitrified waste has been developed.

The 98-ton flasks will look similar to those designed to carry spent nuclear fuel. A fullscale demonstration flask will be ready for safety tests next year.

Shipments by sea are due to start in 1994. It will be the first time British Nuclear Fuels has returned nuclear waste to its country of origin.

**END OF**

**FICHE**

**DATE FILMED**

8 Jan 1991